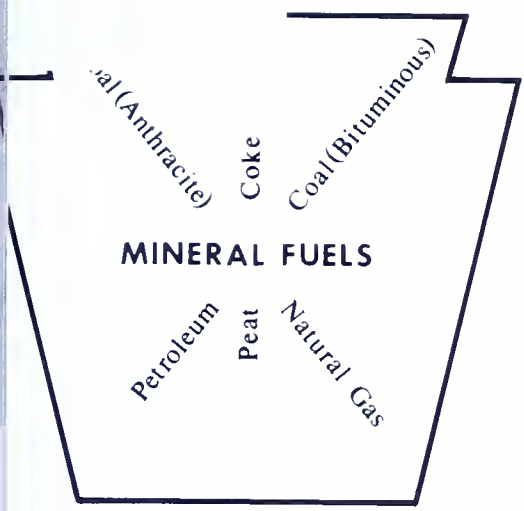
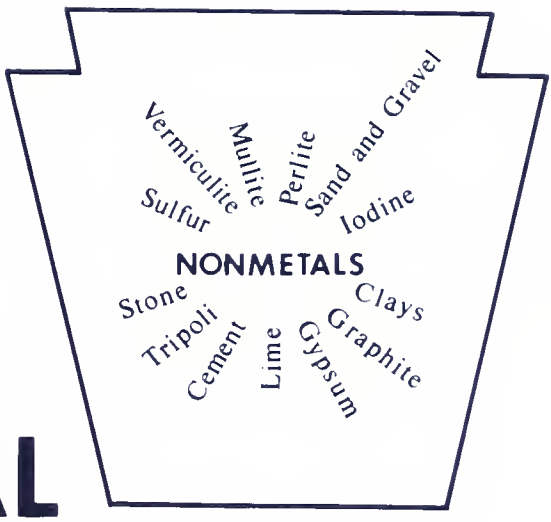
/ G345/4.10/7
.87

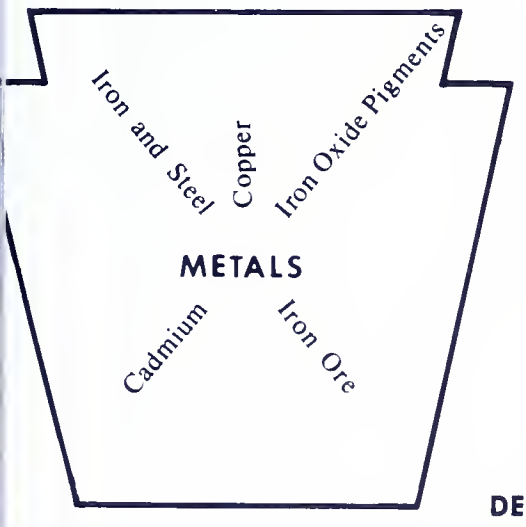
Information Circular 87
1980

PENNSYLVANIA STATE LIBRARY
DOCUMENTS SECTION





THE MINERAL INDUSTRY OF PENNSYLVANIA IN 1976



William Kebblish

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

Digitized by the Internet Archive
in 2016 with funding from
This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

https://archive.org/details/mineralindustryo00kebb_1

The Mineral Industry of Pennsylvania

This chapter has been prepared by the Bureau of Mines, U.S. Department of the Interior, and the Pennsylvania Bureau of Topographic and Geologic Survey, Department of Environmental Resources, under a cooperative agreement for collecting information covering mineral production from mines, quarries, and wells.

By William Kebblish [1]

Pennsylvania mineral production value reached a record $3,041 million, a $133.3 million increase above that of 1975, but $57.3 million less, based on 1967 constant dollars. Compared with 1975, increases in value were attained by masonry and portland cement, anthracite coal, bituminous coal, lime, natural gas, sand and gravel, stone, and zinc. The decrease in petroleum value was due to a slight decrease in production. Collectively, solid fuels production accounted for slightly more than 78% of the total mineral production value, and the value of all fossil fuels equaled 81.7% of the total mineral production value.

Leading producing counties, with primary commodities in parentheses, were Washington, Indiana, Clearfield, and Greene Counties (bituminous coal); Schuylkill, Luzerne, and Northumberland (anthracite coal); Centre (lime); and Montgomery, Lancaster, Bucks, Northampton, and Chester (stone). Pennsylvania led the Nation in production of stone, anthracite coal, and pig iron; third in production of bituminous coal; fourth in smelter production of cadmium; and eighth in the production of zinc.

[1] State Liaison Officer, Bureau of Mines, Harrisburg, Pa.

Table 1.—Mineral production in Pennsylvania [1]

Mineral	1975		1976	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:				
Masonry ---thousand short tons--	357	$14,640	379	$16,903
Portland ---do---	5,815	168,220	5,989	185,170
Clays [2] ---do---	1,945	13,672	2,291	16,037
Coal:				
Anthracite ---do---	6,203	198,481	6,228	209,234
Bituminous ---do---	84,137	2,111,009	85,777	2,173,009
Gem stones	NA	9	NA	9
Lime ---thousand short tons--	1,940	60,047	2,069	68,356
Natural gas ---million cubic feet--	84,676	57,156	89,386	61,229
Peat ---thousand short tons--	27	488	W	W
Petroleum (crude) thousand 42-gallon barrels--	3,264	39,647	3,019	36,700
Sand and gravel ---thousand short tons--	17,401	48,742	19,038	55,611
Stone ---do---	60,177	149,670	63,607	165,889
Zinc (recoverable content of ores, etc.) short tons--	21,090	16,450	22,280	16,487
Value of items that cannot be disclosed: Clays (kaolin), copper (1976), iron ore, mica (scrap), natural gas liquids, tripoli, and values indicated by symbol W	XX	29,607	XX	36,553
Total	XX	2,907,838	XX	3,041,187
Total 1967 constant dollars	XX	1,150,632	XX	p 1,093,306

p Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data included with "Value of items that cannot be disclosed." XX Not applicable.

[1] Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2] Excludes kaolin; value included with "Value of items that cannot be disclosed."

Table 2.—Value of mineral production in Pennsylvania, by county [1] [2]

(Thousands)

County	1975	1976	Minerals produced in 1976 in order of value
Adams	W	W	Stone, lime, clays, mica.
Allegheny	$124,766	$134,474	Coal, cement, petroleum, stone, clays, sand and gravel.
Armstrong	W	W	Coal, sand and gravel, stone, clays, petroleum.
Beaver	W	W	Coal, sand and gravel, clays, petroleum.
Bedford	W	W	Coal, stone, sand and gravel.
Berks	49,935	59,430	Iron ore, cement, stone, coal, sand and gravel, clays, copper.
Blair	3,364	W	Stone, sand and gravel, coal.
Bradford	W	W	Sand and gravel.
Bucks	W	W	Stone, sand and gravel, clays.
Butler	50,648	57,039	Coal, lime, cement, stone, petroleum, sand and gravel, clays.
Cambria	267,816	284,363	Coal.
Cameron	--	W	Sand and gravel.
Carbon	W	W	Coal, sand and gravel, stone.
Centre	W	W	Coal, lime, stone, clays.
Chester	W	W	Stone, lime, clays.
Clarion	92,308	W	Coal, stone, petroleum.
Clearfield	173,237	181,484	Coal, clays, stone.
Clinton	W	W	Coal, stone, clays.
Columbia	W	W	Coal, sand and gravel, stone.
Crawford	W	W	Sand and gravel, petroleum.
Cumberland	W	W	Stone, sand and gravel, clays.
Dauphin	W	W	Stone, coal, sand and gravel.
Delaware	W	W	Stone.
Elk	W	W	Coal, petroleum, stone.
Erie	2,970	W	Sand and gravel, peat, petroleum.
Fayette	W	67,959	Coal, stone, clays, petroleum.
Forest	W	W	Petroleum, sand and gravel, stone.
Franklin	W	W	Stone, sand and gravel.
Fulton	W	W	Stone, sand and gravel, coal.
Greene	W	W	Coal, petroleum.
Huntingdon	9,093	8,902	Sand and gravel, stone, clays, coal.
Indiana	198,168	W	Coal, stone, petroleum.
Jefferson	44,433	48,996	Coal, clays, stone, petroleum.
Juniata	312	193	Stone.
Lackawanna	W	10,869	Coal, peat, stone, sand and gravel.
Lancaster	W	W	Stone, sand and gravel, clays.
Lawrence	W	W	Cement, coal, stone, sand and gravel, clays, peat.
Lebanon	W	W	Lime, stone.
Lehigh	W	W	Cement, zinc, stone.
Luzerne	W	W	Coal, stone, sand and gravel, peat, clays.
Lycoming	8,380	10,269	Coal, stone, sand and gravel.
McKean	W	W	Petroleum, clays, stone.
Mercer	8,239	W	Coal, sand and gravel, stone, petroleum.
Mifflin	W	W	Stone, sand and gravel, lime.
Monroe	W	W	Stone, sand and gravel, clays, peat.
Montgomery	W	W	Stone, lime, cement, clays.
Montour	W	W	Stone.
Northampton	82,750	W	Cement, stone, sand and gravel.
Northumberland	W	W	Coal, stone, sand and gravel, clays, tripoli.
Perry	W	W	Stone.
Pike	W	W	Sand and gravel, stone.
Potter	W	W	Petroleum, stone.
Schuylkill	W	105,872	Coal, stone, sand and gravel.
Snyder	W	W	Stone, coal.
Somerset	W	W	Coal, stone, clays, sand and gravel.
Sullivan	551	1,560	Coal.
Susquehanna	472	W	Stone, coal.
Tioga	W	W	Coal, sand and gravel, stone.
Union	W	W	Stone, clays.
Venango	15,854	23,133	Coal, petroleum, sand and gravel, natural gas liquids.
Warren	7,346	6,758	Petroleum, sand and gravel, natural gas liquids.
Washington	W	W	Coal, petroleum, clays.
Wayne	W	W	Stone, sand and gravel.
Westmoreland	81,298	W	Coal, stone, sand and gravel.
Wyoming	1,775	W	Sand and gravel.
York	34,043	43,327	Cement, stone, lime, sand and gravel, clays.
Undistributed [3]	1,650,077	1,996,560	
Total [4]	2,907,838	3,041,187	

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."

[1] Philadelphia County is not listed because no production was reported.

[2] Value of petroleum is based on an average price per barrel for the State.

[3] Includes some natural gas liquids that cannot be assigned to specific counties, natural gas, petroleum, gem stones, and values indicated by symbol W.

[4] Data may not add to totals shown because of independent rounding.

Table 3.—Indicators of Pennsylvania business activity

	1975	1976 p	Change, percent
Employment and labor force, annual average:			
Total civilian labor force ——thousands	5,072	5,120	+0.9
Unemployment ——do	422.0	406.2	−3.8
Employment (nonagricultural):			
Mining ——do	46.1	48.0	+4.1
Manufacturing ——do	1,334.8	1,332.3	−.2
Contract construction ——do	184.5	180.6	−2.1
Transportation and public utilities ——do	256.5	255.0	−.6
Wholesale and retail trade ——do	886.8	914.9	+3.2
Finance, insurance, real estate ——do	207.3	210.5	+1.5
Services ——do	798.5	831.7	+4.2
Government ——do	721.4	718.8	−.4
Total nonagricultural employment ——do	[1] 4,435.7	[1] 4,491.7	+1.3
Personal income:			
Total ——millions	$69,642	$76,385	+9.7
Per capita	$5,872	$6,439	+9.7
Construction activity:			
Number of private and public residential units authorized	33,019	42,111	+27.5
Value of nonresidential construction ——millions	$447.9	$564.4	+26.0
Value of State road contract awards ——do	$199	$150	−24.6
Shipments of portland and masonry cement to and within the State ——thousand short tons	2,920	3,024	+3.6
Mineral production value:			
Total crude mineral value ——millions	$2,907.8	$3,041.2	+4.6
Value per capita, resident population	$245	$256	+4.5
Value per square mile	$64,144	$67,085	+4.6

p Preliminary.
[1] Data may not add to totals shown because of independent rounding.

Sources: U.S. Department of Commerce, U.S. Department of Labor, Highway and Heavy Construction Magazine, and U.S. Bureau of Mines.

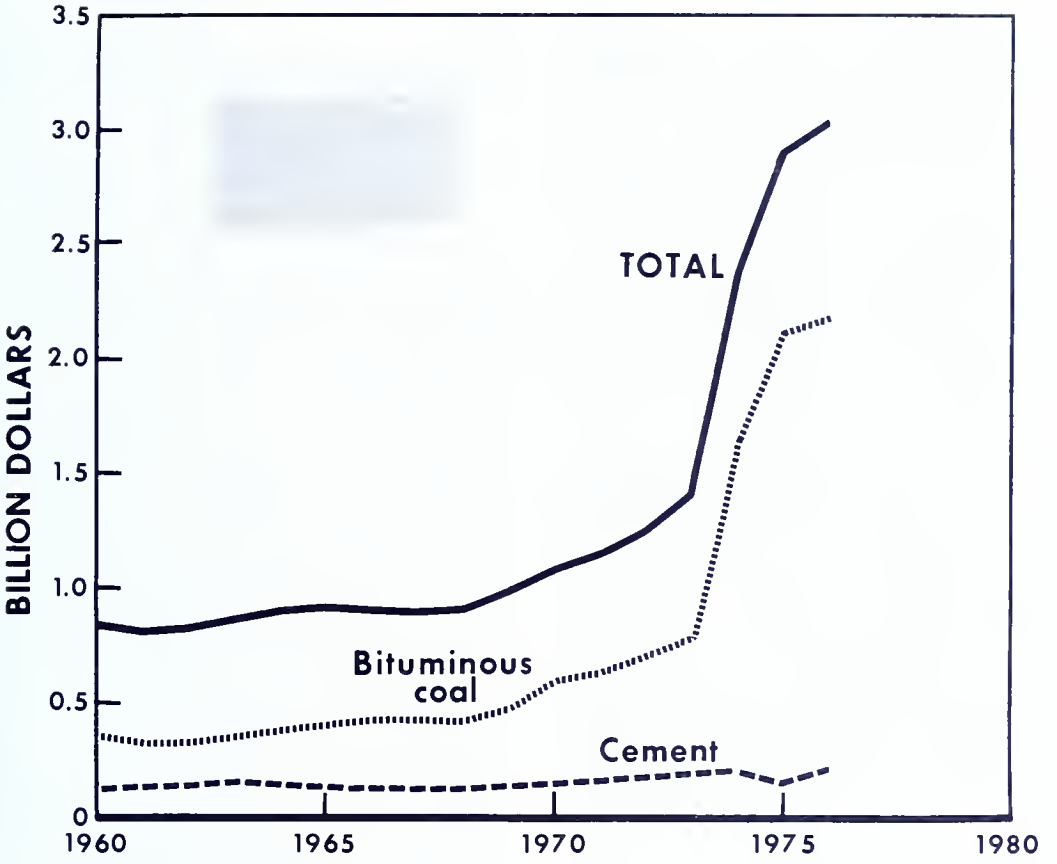


Figure 1.—Value of bituminous coal, cement, and total value of mineral production in Pennsylvania.

Legislation and Government Programs.—Legislation enacted during the year of interest to the minerals industries included the following:

Act 145, amended the act of March 31, 1937 (P.L. 160, No. 43), entitled "An Act creating a commission to be known as the Pennsylvania Public Utility Commission (PUC)," on July 9, 1976 by adding Section 7.1: which pertains to establishing a Bureau of Conservation, Economics and Energy Planning.

Acts 103 and 120, which amended The Land and Water Conservation Act (Act 443 of 1968) known by several short titles with respect to the abandoned mine reclamation portion: "Project 500," "Operation Scarlift," or "The Bond Issue Program." There have been several amendments to the basic act affecting Section 16a that covered abandoned mine reclamation work. Two such amendments, Nos. 103 and 120, were passed in 1976. Currently, this act authorizes the expenditure of $200 million to June 30, 1981, for abandoned mine reclamation as follows: $140 million for the abatement of acid mine drainage (AMD); $20 million for the abatement of air pollution from burning refuse banks; and $40 million for the control of underground mine fires, and the control of surface subsidence over abandoned mines.

As of December 31, 1976, the following net expenditures and encumbrances, along with accomplishments, have been made since inception of the program:

AMD Abatement: 344 projects, $72.6 million;
200 miles of streams improved, 10 treatment plants in operation, 32 deep mine complexes sealed, 2,500 acres restored, and 37 banks reclaimed.
Burning Banks: 20 projects, $17.0 million;

9 million cubic yards of material handled.

Underground Fires and Subsidence: 122 projects, $28.4 million;
1,164 acres of built-up areas protected representing $311 million of real estate.

In addition to the State funds, about $23 million in matching Federal funds have been used.

Act 264, defines emergency medical technician; authorizes such personnel to render emergency care; exempts such personnel and physicians working in conjunction with them from civil liability when rendering such care; and makes repeals.

The Emergency Medical Training Program, Act 178, signed into law July 9, 1976, with an effective date 60 days after date of enactment provides the following: At least one emergency medical technician (EMT) shall be on duty at a mine at any time when miners at that mine are engaged in the extraction, production, or preparation of coal. EMTs shall be on duty at a mine in sufficient numbers to assure that no miner shall work in a mine location that cannot be reached within a reasonable time by an EMT. EMTs shall be employed on their regular mining duties at locations convenient for quick response to emergencies, and further shall have available to them necessary equipment at all times in compliance with Federal regulations.

On or before July 1, 1978, operators of coal mines shall make adequate provisions so that at least one EMT paramedic, registered nurse, physician, or physician's assistant shall be available to provide care at a mine at any time that miners at the mine are engaged in the extraction, production, or preparation of coal, and such EMT paramedic, registered nurse, physician, or physician's assistant shall be on call to reach the entrance of the mine within 30 minutes.

The law also provides regulations for training and certification, first aid training of coal mine employees, continuing liability of physicians and surgeons, and equivalent training.

Act 180, amending the Act of June 2, 1915 (P.L. 736, No. 338), entitled, as amended, "An Act defining the liability of an employer to pay damages for injuries received by an employee in the course of employment; establishing an elective schedule of compensation; and providing procedure for the determination of liability and compensation thereunder; and prescribing penalties," further defining occupational disease to include fractionation area employees who develop hepatitis.

Act 222, amending the Act of June 22, 1937 (P.L. 1987, No. 394), entitled, as amended, "An act to preserve and improve the purity of the waters of the Commonwealth for the protection of public health, animal and aquatic life, and for industrial consumption, and recreation; empowering and directing the creation of indebtedness or the issuing of nondebt revenue bonds by political subdivisions to provide works to abate pollution, providing protection of water supply; providing for the jurisdiction of courts in the enforcement thereof; providing additional remedies for abating pollution of waters; imposing certain penalties; repealing certain acts; regulating discharges of sewage and industrial wastes; regulating the operation of mines; and placing responsibilities upon landowners and land occupiers," changing provisions relating to penalties.

Act 279, amending the Act of January 8, 1960 (1959 P.L. 2119, No. 787), entitled, as amended, "An Act to provide for the better protection of the health, general welfare, and property of the people of the Commonwealth by the control, abatement, reduction and prevention of the pollution of the air by smokes, dusts, fumes, gases, odors, mists, vapors, pollens and similar matter, or any combination thereof; imposing certain powers and duties on the Department of Environmental Resources (DER), the Environmental Quality Board, and the Environmental Hearing Board; establishing procedures for the protection of health and public safety during emergency conditions; creating a stationary air contamination source permit system; providing additional remedies for abating air pollution; reserving powers to local political subdivisions and defining the relationship between this act and the ordinances, resolutions, and regulations of counties, cities, boroughs, towns, and townships; imposing penalties for violation of this act; and providing for the power to enjoin violations of this act; and conferring upon persons aggrieved certain rights and remedies," exempting the production of agricultural commodities in their unmanufactured state from the provisions of the act.

The Environmental Quality Board adopted policies for critical environmental areas for the Commonwealth's Environmental Master Plan on November 18, 1976. The policies are not, nor are they intended to be, rules or regulations, nor the sole determinants for guiding future Commonwealth actions. The development of policies that reflect an overall environmental sensitivity may be, in some instances, in conflict with other policies addressing social and economic priorities. The resolution of policy conflict and the resultant balancing of priorities and social costs is recognized as an integral part of any program to implement the master plan. The policies of the Environmental Master Plan begin to provide the foundation for environmentally sensitive growth and development throughout Pennsylvania. The policies provide an ecologically sound perspective to plan for future growth and also identify environmental concerns that must be studied and considered in the decisionmaking process.[2]

The Commonwealth of Pennsylvania was granted $292,000 by the National Oceanic and Atmospheric Administration (NOAA) to continue work on Pennsylvania's Coastal Zone Management Program. The grant will be used to build a program of balanced prudent use of the State's two coastal areas —the Lake Erie coast and the tidal estuary in the Lower Delaware River. This is the third grant made by the Federal Government to Pennsylvania coastal zone management.

Pennsylvania mines release more than 50 million cubic feet of methane daily during mining operations and efforts are being made to recover this previously wasted fuel, which is currently being ventilated to the atmosphere. Two years ago Pennsylvania State University with joint funding by the Pennsylvania Science and Engineering Foundation and the Federal Bureau of Mines established a research group to advance the technology of methane recovery. Three wells were drilled on the Cumberland mine site approximately 7 miles south of Waynesburg. Drilling was initiated in November 1975 on Well No. 1034, which was drilled to a depth of 825 feet and located to intersect one of the main entries of the underground coal mine. Drill Hole No. 1036, which was drilled to a depth of 1,025 feet into the Pittsburgh seam, was used as a control or reference hole since it is located in an area that will permit up to 5 years of undisturbed observation and monitoring. The third well, No. 1035, was planned to intersect the Freeport seam at a depth of 1,300 feet. Natural methane flow from the three wells is being observed prior to stimulation, which will occur at a later date.[3]

The Federal Bureau of Mines is attempting to use coalbed degasification methods at a mine being developed by Emerald Mine Corp. in Greene County. Scientists estimate that at least 245 million cubic feet of methane is trapped in the part of the Pittsburgh coal seam underlying the 129-acre test site.[4]

The U.S. Army Corps of Engineers will handle construction of an aboveground complex for testing underground mining machinery under a $12 million interagency agreement with the Interior Department's Bureau of Mines. The Corps will contract for construction of the complex, furnishing construction management expertise. The "proving grounds," to be built at the Bureau's Pittsburgh Mining and Safety Research Center in Bruceton, will feature areas for equipment trials, roof support research, and research and development on hydraulic transportation of coal. A laboratory and test plant for coal-cleaning research is proposed as a later addition. Elements of the complex was scheduled to be ready for use by the Bureau in the fall of 1977.[5]

A contract for operating the newly constructed Synthane Pilot Plant, near Pittsburgh, was signed recently by ERDA and C-E Lummus Company. ERDA will provide $26.3 million for operation of the plant between August 1976 and September 1978. C-E Lummus, a subsidiary of Combustion Engineering, Inc., will operate the plant under a cost-plus-fixed-fee contract. The pilot plant will use coal for conversion to synthetic gas. This plant is the only high-Btu gasification facility in the United States wholly supported with Federal funds. The $15 million Synthane plant, located in South Park Township, Allegheny County, is designed to process 72 tons of coal per day into 1.2 million cubic feet of pipeline-quality gas.

---

[2] Pennsylvania Bulletin. V. 7, No. 4, Jan. 22, 1977.
[3] Earth and Mineral Sciences. V. 46, No. 3, December 1976.
[4] U.S. Department of the Interior. News Release, Nov. 10, 1976.
[5] U.S. Department of the Interior. News Release, July 26, 1976.

Admiral Peary, Vocational-Technical School located in Ebensburg, Cambria County, received $45,500 from the Appalachian Regional Commission as a grant to aid in construction and $81,260 from the U.S. Office of Education for a curriculum to train students for the coal mining industry and to retrain current mining employees.

Waynesburg College approved a unique baccalaureate degree mine-management-major program designed for students who have completed 2-year mining technology programs. The new major, which covers the junior and senior years, was developed following a recommendation to the college's Mining Advisory Committee of Industry and Union representatives. The college faculty recently approved the mine management major as part of Waynesburg's regular academic program.

Environment.—Control of air pollution in Pennsylvania, especially in the Pittsburgh region, continued to be a problem throughout the year. The Group Against Smog and Pollution (GASP) questioned reliability of air pollution data and sampling methods used to monitor the air during a recent pollution emergency. GASP also requested assistance from the Common Pleas Court concerning pollution controls from the steel industries' coke ovens. It was reported that the Occupational Safety and Health Administration (OSHA) requested Wheeling-Pittsburgh Steel Corp. to comply with OSHA regulations on coke oven coal tar pitch volatiles. United States Steel Corp. was cited by State and Allegheny County agencies with 241 violations of a 1972 consent decree to curb air pollution at U.S. Steel's Clairton Coke Works. President Judge Ellenbogen of Common Pleas Court ordered attorneys for both sides to consider the new consent decree and begin to implement the pact, which permits U.S. Steel 7 years to achieve substantial compliance with new standards and until 1988 to reach full and final compliance. U.S. Steel plans to spend more than $600 million at the Clairton facility to construct 3 new coke oven batteries, to rehabilitate 7 others, and shut down 13 older batteries.

Bethlehem Steel Co. was cited by Pennsylvania officials of polluting the air in Johnstown with Benzo (A) Pyrene (BAP) that are 30 to 60 times higher than the national average. Coke ovens and a cinder plant were cited as the major pollutant sources. In late August, Bethlehem Steel and the DER reached a tentative agreement on pollution control measures, but in early December a lawsuit by the State charged Bethlehem with coke oven pollution violations.

A plan for fighting a mine fire threatening Fayette County homes was approved by the Secretary of the Interior. The Department of the Interior said its Bureau of Mines and Pennsylvania DER jointly investigated leaks of sulfur dioxide and carbon monoxide in parts of Upper Tyrone and Bullskin Townships. The source of the leaks was verified as an underground fire in an abandoned coal mine. To protect residents, the plan calls for sealing holes funneling carbon monoxide and sulfur dioxide toward homes. To shut off the fire's air supply, surface cracks will be sealed by plowing and compacting the earth.

Allegheny Power System Inc. will conduct research on a method of removing sulfur dioxide from stack gases at its coal-burning generating plant near Pittsburgh. If successful, the $7 million project conducted over a 2- to 3-year period would be applied to the entire plant at a total cost of $45 million.

Residents of the once-thriving coal-mining city of Shamokin in central Pennsylvania can look forward to possible relief from acrid fumes, smoke, and land slippage that have plagued them for more than 25 years. A mine fire, detected as long ago as 1951, has since spread through six coalbeds of the abandoned Cameron Colliery mine, which was in operation from about 1866 to the mid-1930's. The waste bank consists of about 14 million cubic yards of refuse from the mine. Burning portions of it contain 4 to 5 million cubic yards of material, extending nearly a mile along Big Mountain and rising 200 to 400 feet higher than the city. Pollution from the fire has posed serious health hazards to Shamokin residents, particularly the elderly and those with respiratory problems, and especially on windless days when stagnant air is locked against the mountain. The Bureau of Mines estimates that completion of the entire project would take about 3 years.[6]

A grant of $225,000 was made by the Appalachian Regional Commission to halt a mine fire that has been burning at Wan-

[6] U.S. Department of the Interior. News Release, Sept. 27, 1976.

amic Colliery 19, Newport Township, since 1959. In addition, the State will add $75,000 to meet the $300,000 cost of the project. State Department of Environmental Resources, Bureau of Appalachian Development, has reported that the fire is spreading and now is within 100 feet of the barrier pillar between No. 19 mine and the Susquehanna No. 6 mine. Under the grant, an ash barrier will be placed in a trench between the fire and the barrier pillar.

Costly pollution control devices will be eliminated if the $35 million coal cleaning plant of Pennsylvania Electric Co. (Penelec) fulfills expectations in Indiana County. The plant, scheduled to open in 1977, is being constructed near a Penelec coal mine and near a 650,000-kilowatt generating station that Penelec is building in Homer City at a cost of more than $300 million. Instead of using scrubbers in the smoke stack of the generating station to reduce emission of pollutants, Penelec will remove considerable sulfur from the coal before it is burned. The coal will be crushed and passed through two washing processes, involving centrifugal force and use of magnets, before final separation. But the second step at the Penelec cleaning plant is vital for power companies because it separates the coal into two streams. One stream that emerges will be low-sulfur coal, with a 0.8% or less sulfur content; the second will be moderate-sulfur coal with about 2.2% sulfur content. Once the coal is dried, it will be pulverized to the consistency of corn meal. Then the low-sulfur coal will be conveyed to the generating station now under construction. The moderate-sulfur coal will be conveyed to two 600,000-kilowatt generating stations that Penelec has operated in Homer City since 1969. EPA regulations allow stations in operation before 1974 in the Southwest Air Basin to burn coal with a sulfur content of between 1.8 and 3% without scrubbers. Penelec officials expect to process annually 1.3 million tons of low-sulfur coal and 3.5 million tons of moderate-sulfur coal.

Pennsylvania Power and Light Co. (PP&L) has also taken steps to reduce the sulfur content of coal prior to use in company-owned power stations. Greenwich, an operating unit of Pennsylvania Mines Corp., a subsidiary of PP&L, has added twin fine-coal-cleaning circuits using Batac jigs to an existing coarse-coal preparation plant. The Batac jigs are the first such units purchased for application in the United States from the German manufacturer Humboldt-Wedag.

The U.S. Supreme Court refused to consider an appeal of the West Penn Power Co., which sought an injunction against a pollution control order affecting its Mitchell power station in Washington County. The case involved sulfur dioxide emissions from the plant.

Firestone Tire and Rubber Co. signed an agreement with Pennsylvania State officials allowing it to experiment with burning high-sulfur coal in a boiler at its tire and plastics manufacturing complex in Pottstown. The pilot plant program is designed to evaluate a chemical wet-scrubbing device for the removal of sulfur dioxide and particulate emissions.

The Federal Bureau of Mines signed a $12.7 million cost-sharing agreement with St. Joe Minerals Corp. to demonstrate the Bureau's citrate process for scrubbing sulfur dioxide out of powerplant flue gas. The tests will involve the 50-megawatt boiler at St. Joe's George F. Weaton powerplant in Monaca.

Quality of approximately 900 miles of Pennsylvania streams improved in the period 1971–75, whereas 200 miles of stream were upgraded for a net gain in water quality of 700 miles. This information is contained in "Commonwealth of Pennsylvania 1976 Water Quality Inventory" prepared by DER's Bureau of Water Quality Management. The annual report on water quality also states that an overall average of 80% of the State's major streams through five drainage basins are in compliance with State water quality standards. Degree of compliance ranges from 98% in the Potomac River Basin to 72% in the Delaware River Basin. The Susquehanna and Ohio Basins each show 80% compliance and the Lake Erie Basin, 82%. DER estimates that by 1983, 2,253 miles of major streams will fail to meet established water quality goals. Mine drainage from abandoned mines, acting either alone or in combination with other pollution sources, accounts for more than 85% of this problem. The estimated cost of abating mine drainage problems is $1 billion.

Construction is underway at the new Ernest acid mine treatment plant at Creekside, Indiana County. This project will restore more than 27 miles of Crooked Creek

and improve water quality in Crooked Creek State Park Lake, Armstrong County.

Completion of a $389,553 mine drainage pollution abatement project in Little Toby Creek Watershed, south-central Elk County, was announced recently by DER. Reclaiming and revegetating strip mines and coal refuse areas in the watershed is expected to reduce the acid load entering the Little Toby Creek by an estimated 1,300 pounds per day, thereby improving the water quality both of Little Toby Creek and of Toby Creek to its confluence with Clarion River.[7]

The Rausch Creek acid treatment plant near Valley View, Schuylkill County, was dedicated September 18. The plant can treat 20 million gallons of acid-polluted water per day, which would eliminate the flow of polluted water into the Susquehanna River through the Little Mahantango Creek. This stream has been returned to the list of those that the Pennsylvania Fish Commission annually stocks with trout.[8]

A 13-acre area in Forbes State Forest, Ogle Township, Somerset County, is being reclaimed. Under a 1973 agreement between PBS Coals, Inc., Mercersburg, the DER, and members of the Gould family, the company was allowed to surface mine on portions of the Forest in return for reclamation of previously stripped lands. As a result of the recently completed mining, the abandoned deep mine was removed completely and further acid discharges were eliminated.[9]

Beaver Contracting & Excavating Company of Rochester was awarded a mine drainage pollution abatement demonstration project at Hillman State Park at the northern end of Washington County. The project called for moving about 1.2 million cubic yards of dirt on an area that had been strip mined, and specially treating the surface of the reclaimed area with fly ash prior to reseeding. The pilot project uses fly ash to control the pH level of the soil and make it a better medium for seeding purposes.

DER moved closer to ending pollution in Westmoreland County waterways with the completion of a $27,845 project in Salem and Washington Townships. To reduce acid mine drainage into Thorn Run, which flows into Beaver Run Reservoir, DER financed the dismantling of a dilapidated coal sorting and cleaning building; regrading, covering, and seeding a spoil pile; sealing a mine opening and two sink holes; and constructing a stream channel.

DER awarded a $1.5 million contract to No. 1 Contracting Corp., West Pittston, for the hydraulic flusing of mine voids in Plymouth. The project involves flushing mine voids in the Stanton, Five Foot, and Baltimore veins of the abandoned Nottingham Colliery. In addition to drilling boreholes through which the material will be pumped, the project also involves flushing the mine voids with 464,400 long tons of crushed breaker refuse. Seventy-five percent of the costs will be financed through the Appalachian Regional Development Act of 1965; the remaining 25% will be financed by the State.

A $220,000 Federal-State project aimed at controlling water buildup in the No. 3 slope mine of Hegins Mining Co. in Schuylkill County has been approved by the Department of the Interior. This is one of several interconnected mines in Porter Township that has been troubled by water seeping from one mine into another after heavy rains. The project will involve installing a high-volume, deep-well pump at the No. 3 slope mine, which has been flooded on several occasions. The pump will be provided by the State of Pennsylvania and installed by State contract in a well yet to be drilled. Installation of the pump is expected to keep the mine dry even in periods of heavy rainfall.[10]

The Luzerne County Commissioners approved sealing the opening of an abandoned mine shaft in the Miners Mill section of Wilkes-Barre.

On March 2 the Commonwealth Court ruled that Barnes and Tucker Coal Co., Johnstown, must pay for treating all acid mine water draining from its abandoned Lancashire No. 15 mine, near Barnesboro, Cambria County. Acid mine water had been flowing from the mine since 1970, and State courts were hearing the case for a 5-year period.

The Laurel Creek Watershed Association, Somerset County, is opposed to proposed surface mining and construction of powerplants in the Laurel Hill Creek Watershed. Proposed State regulations list this watershed as a restricted area and deny issuance

[7] Pennsylvania Econotes. November 1976.
[8] Pennsylvania Econotes. October 1976.
[9] Pennsylvania Econotes. January 1976, p. 9.
[10] U.S. Department of the Interior. News Release, June 17, 1976.

of mining permits, but experimental permits may be issued.

Pennsylvania has apparently won its case for stricter pollution controls along Ohio's Mahoning River, which flows into Pennsylvania and supplies drinking water to communities in Beaver County. The Environmental Protection Agency said that all steel mills in the Mahoning River Valley would have to meet all Pennsylvania water quality standards before pollution-discharge permits are issued.

The "Public School Code of 1949," as amended, requires that any school district or authority planning to construct or reconstruct a school building in an area certified by DER to be subject to mine subsidence, shall, before beginning to design, obtain a DER evaluation of the substrata of the land upon which it will be situated. As to any school building, construction or reconstruction project of the type covered by this act, the design for which has already been completed but as to which actual construction has not yet commenced as of the effective date of this act, the involved school district or authority shall also obtain the substrata evaluation required before beginning actual construction.

Subsidence damaged facilities in the Belle Vernon School District for the second time this year, temporarily closing part of the newest edition to Marion Elementary School in Washington Township, Fayette County. Previous subsidence had occurred at the Bellmar Junior High School. Over the past decade, abandoned mines have caused other subsidence problems in the North Belle Vernon Borough area.

Consolidation Coal Co. (Consol) agreed to fill in a mine subsidence hole in South Park and repair the surface of the parking lot where the cave-in occurred. Consol's Montour No. 10 mine had been extracting coal in the general area at the time subsidence occurred.

Harrison Township officials questioned mine subsidence regulations and were told that insurance will cover subsidence caused by underground mines, but coverage is not applicable for change in strata caused by soil conditions.

The Federal National Mortgage Association (FNMA) adopted new requirements designed to alert the home building industry of potential subsidence problems in western Pennsylvania. The FNMA never had subsidence requirements, but through a ruling, now requires written proof from environmental agencies and coal companies that the site will not have subsidence.[11]

Electricity.—Pennsylvanians used a record 92.1 billion kilowatt-hours of electricity in 1976, compared with 87.6 billion kilowatt-hours in 1975. Pennsylvania's use of electricity has increased more than 60% in the past 10 years, while generation of electrict power increased 71%. Projections show use of electricity in Pennsylvania will be 70% greater in 1985 than in 1975. Business and industry account for over two-thirds of Pennsylvania's consumption of electricity, with residential use accounting for 30% of the total. In the future, industry will continue to take the principal share of electricity, with residential and commercial users consuming electricity at a slower growth rate.[12]

In 1975, 92% of the kilowatt-hours produced by PP&L were derived from coal, and 5% came from oil-fired equipment. Cost to produce 1 kilowatt of electricity in 1975 was 2.8 cents, with company projections of 4 cents in 1980 and 5 cents by the mid-80's. During the period of April to June 1976, coal was used to generate 94.8% of all PP&L electricity at an average fuel cost of 1.10 cents per kilowatt-hour. During this 3-month period, the average cost for purchased coal rose 45 cents per ton, from $26.59 to $27.04. Residual oil used at other generating plants increased 18 cents per barrel to $12.01, and light oil increased one-tenth of 1 cent to 31.9 cents per gallon.

PP&L's Susquehanna Steam Electric Station, in Salem Township, Luzerne County, is the company's first nuclear powerplant with twin 1,050-megawatt generating units scheduled for completion in 1982. The $2 billion complex was 20% completed at the end of the year.

Metropolitan Edison Co.'s Three Mile Island atomic plant south of Harrisburgh will install a charcoal filter in the containment vessel to reduce the amount of radioactive iodine, which is routinely released into the atmosphere in the form of gases. The Three Mile Island nuclear plant was idle from February 20 to April 26 for refueling. Fifty-six of the fuel assemblies were

[11] Pennsylvania Econotes. January 1976.
[12] Pennsylvania Electric Association. Facts You Should Know About Electric Power in Pennsylvania–1976.

replaced and maintenance work was completed on the reactor vessel.

Westinghouse Electric Corp. agreed in April to deliver 124,000 pounds of uranium to three utility companies operating a Beaver County nuclear reactor. Westinghouse had informed its nuclear-generating companies that it could not meet contractural obligations reached in 1969, but a preliminary injunction filed in late 1975 by the three firms, was necessary to obtain the fuel.

One of the Philadelphia Electric Co. (PEC) Peach Bottom nuclear units was taken out of service on May 25 because of an electrical problem and restored to service June 1. The unit provided about 8% of the 1975 utilities electric output. The second Peach Bottom unit closed March 31 for annual maintenance and refueling; operation will resume in late June.

In Beaver County, Duquesne Light Co. was constructing three nuclear-fueled power stations, and PPC was building the three-unit Bruce Mansfield coal-fired complex.

Transportation.—PP&L leased its ninth unit train for hauling coal between Pennsylvania mines and PP&L generating plants. The cars are loaded every 2 or 3 days, which usually allows 2 days of travel time and 6 hours for loading and between 4 and 8 hours for dumping at the powerplants. Roundtrip milage averages between 400 and 500 miles. The most recent acquisition of Train No. 9 brings the company fleet to a total of 997 hopper cars. These cars are loaded at any of the 12 present coal suppliers in central Pennsylvania, including 4 company-owned mines, and can make delivery to 3 of the company's coal-fired steam electric stations, Montour, Brunner Island, and Martins Creek.

The Economic Development Council of Northeastern Pennsylvania received a $37,334 grant to conduct a study to determine the feasibility of short railroad lines and other alternatives to maintain essential branch-line service through northeastern Pennsylvania.

Consolidated Rail Corp. (ConRail) has been rehabilitating tracks in Pennsylvania. Two crews spent the summer replacing cross ties between Wilkes-Barre and White Haven and the Poconos. Welded rail will be installed between White Haven and Laurel Run. In addition, welded rail has been replaced in the Allentown-Bethlehem area. ConRail operates 35,000 miles of track in the northeastern part of the United States.

Governor Shapp and the Volkswagen Corp. signed an agreement to establish an auto assembly plant at New Stanton, east of Pittsburgh. Part of the financial arrangements include $30 million in State appropriations, mostly for a railroad and highway link to the plant. The money has been approved by the State Legislature.

Governor Shapp also signed legislation that will permit the continued operation of about 700 miles of railroad lines that could have been abandoned under the Federal rail reorganization plan. The bill permits the State to subsidize operation of the lines, most of which are spurs in the eastern and northeastern part of the Commonwealth.

The Pittsburgh and Lake Erie Railroad (P&LE) won trackage rights to operate its trains to Lake Erie under final plans of the United States Railroad Association (USRA) and its reorganization of bankrupt northeast lines. P&LE, a carrier of iron ore to Pittsburgh area steel mills, will have assured access to loading docks at Ashtabula, Ohio, under the agreement granting it the right to use former Penn Central tracks at Youngstown, Ohio. P&LE serves steel mills in the Aliquippa, Pittsburgh, and Monessen areas, other than those of U.S. Steel which controls the Union Railroad.

Many railroads were affected by a 24-day coal strike that started on July 19 in West Virginia. The Chessie System furloughed more than 1,000 employees mainly in West Virginia. P&LE furloughed 100 employees. ConRail lost revenue of approximately $6 million since the strike started. The Bessemer and Lake Erie Railroad, a subsidiary of U.S. Steel, hauling ore and limestone south from Conneaut was not affected by the strike.

REVIEW BY MINERAL COMMODITIES

MINERAL FUELS

Coal (Anthracite).—Production decreased for the 12th consecutive year to 5.3 million tons according to DER. Strip mine production totaled 2.9 million, nearly 18% higher than in 1975; however, decreases of 28% occurred in bank production and 13%

in deep-mine production. The leading counties, in descending order of production, were Schuylkill, Luzerne, Northumberland, Carbon, Lackawanna, Columbia, Sullivan, Dauphin, and Susquehanna. Deep-mine production occurred only in Schuylkill, Northumberland, Columbia, and Dauphin Counties. Employees totaled 3,641, 6% fewer than in 1975.

Of the 4.8 million tons of anthracite shipped to market, 38% was by rail and 62% was by truck. Less than 500,000 tons was sold locally for space heating, and less than 10,000 tons was used at the mine site for steam and heating purposes.

Leading producers of anthracite were as follows, in descending order with production in short tons in parenthesis: Jeddo-Highland Coal Co. (787,774), Reading Anthracite Co. (545,983), Bethlehem Mines Corp. (468,817), Beltrami Enterprises, Inc. (277,320), Leon E. Kocher Coal Co. (267,129). Heckla Machinery and Equipment Co. (262,969), Ken Pollock, Inc. (132,667), Swatara Coal Co. (132,046), and Gilberton Coal Co. (131,057).

Table 4.—Pennsylvania: Production of anthracite coal and number of employees, in 1976, by county

County	Production (short tons)				Number of employees				
	Deep mines	Bank mines	Strip mines	Total	Deep mines	Bank mines	Strip mines	Breaker and washery	Total
Carbon	--	180,822	75,133	255,955	--	13	48	--	61
Columbia	36,529	--	31,059	67,588	50	--	42	--	92
Dauphin	8,574	16,678	--	25,252	15	3	--	20	38
Lackawanna	--	93,664	11,764	105,428	--	19	5	61	85
Luzerne	--	401,062	1,013,245	1,414,307	4	81	384	311	780
Northumberland	61,792	392,800	262,315	716,907	129	14	187	171	501
Schuylkill	409,460	729,894	1,507,246	2,646,600	531	174	692	648	2,045
Sullivan	--	--	57,353	57,353	--	--	23	10	33
Susquehanna	--	2,386	--	2,386	--	1	--	5	6
Total	516,355	1,817,306	2,958,115	5,291,776	729	305	1,381	1,226	3,641

Source: Pennsylvania Department of Environmental Resources, 1976 Annual Report on Mining, Oil and Gas, and Land Reclamation and Conservation Activities.

PP&L is considering low-sulfur anthracite for power generation. Four 400,000-kilowatt generating units would be operational in 1985 and consume 4 million tons of anthracite yearly.[13]

Tuscarora Coal Corp. will build and operate an anthracite preparation plant slated for construction in Schuylkill County. The treatment plant will be constructed near Pottsville as a joint venture between Glen-Gery Corp., a manufacturer of brick, and Gale Coal Co.; it will employ heavy-media equipment. The joint venture was formed to mine and process anthracite in a plant with a rated capacity of 125 tons per hour, equivalent to about 350,000 tons per year. About 80,000 tons of the anthracite will be used internally by Glen-Gery; the balance will be sold on the open market. Glen-Gery has used anthracite to produce low-Btu gas for its brickmaking operations since 1950 and, with construction of the Tuscarora preparation plant, will meet its energy requirements from anthracite.

Two new surface coal-stripping operations were started in Newport Township by Beltrami Enterprises. The first surface mine is at Stearns Station; the second is in the Retreat Mountain area north of Glen Lyon. Coal produced from the Ross Vein will move to plants in Nanticoke and Ashley before it is sent to the Huber preparation plant. In late July, 400 employees at Humboldt, Oneida, and Wyoming Valley breakers were furloughed due to a seasonal adjustment of anthracite coal stocks. A month later, the Huber Colliery, in Ashley, was dismantled and the four-story structure cut up for scrap.

Businessmen from the Scranton and Reading area purchased for $2.5 million approximately 5 million tons of culm in the Mocanqua area from Carrier Coal Enterprises. Coal will be recovered from the culm banks and marketed in the area.

In January 1976, the Governor's Science Advisory Committee published a report, "Recommendations on a Feasibility Analysis." The report focuses on open pit anthracite mining with full restoration to a desirable land use, as an alternative to conventional deep-mining systems.[14]

The retired president of the Reading Anthracite Co. and a representative of the Smithsonian Institute wrote an article, "Our Oldest Coal Town." The article pinpointed Wilkes-Barre as the Nation's oldest, continuously operating coal town and described the history of the anthracite industry in northeastern Pennsylvania.

In late November, a large block of anthracite coal measuring 9 feet by 12 feet and 5 feet high was mined in Bethlehem Mines Corp.'s Panther Valley Division, transported to Our Lady of Mt. Carmel Church in Nesquohaning, Carbon County, and placed outside the church to memoralize those who have lost their lives in anthracite mines. This block of coal is believed to be the largest single chunk of coal brought to the surface intact.

In Wilkes-Barre, anthracite was again ignited at the historic grate of the former Old Fell House, now known as The Tavern. This 168th anniversary commemorates Judge Jesse Fell's findings on February 11, 1808, that anthracite could be used as a household fuel.

A Federal grand jury indicted six Pennsylvania coal companies on charges of conspiring to fix hard-coal prices during a 13-year period. The indictment, returned in Federal Court in Harrisburg, named Blue Coal Corp., Ashley; Glen Burn Colliery Inc., Mt. Carmel; Greenwood Stripping Co. and Lehigh Navigation-Dodson Co., both of Bethlehem; and Lehigh Valley Coal Sales and Reading Anthracite Co., both of West Pittston. As a result of the conspiracy, prices for hard coal were maintained at "artificial and noncompetitive" levels and competition in the industry has been restrained, the indictment contends.

Coal (Bituminous).—Pennsylvania, the third largest bituminous coal-producing State, produced 85.7 million tons, 2% more than in 1975. Production decreases occurred in deep-mined coal, auger production, and refuse production, but strip-mined coal increased 7% compared with the 1975 level. The total number of mining operations increased from 1,740 in 1975 to 1,913 in 1976. The addition of 4 underground mines brought the total deep mines to 159; 11 additional auger operations resulted in a total of 64; and refuse operations remained at 16. The greatest increase occurred in surface mining operations with an increase of 168 which brought the total to 1,498.

Consol's new Westland No. 2 mine located near Westland, Washington County,

[13] Mining Congress Journal. December 1975, p. 12.

[14] State of Pennsylvania, Governor's Science Advisory Committee. Recommendations on a Feasibility Analysis. January 1976.

Table 5.—Pennsylvania: Production of bituminous coal, number of employees, and number of operations, in 1976, by county

County	Production (short tons)					Number of employees						Number of operations		
	Deep	Strip	Auger	Refuse	Total	Deep	Strip	Auger	Refuse	Tipple and preparation plants	Total	Deep, strip, and auger mines	Refuse piles	Tipple and preparation plants
Allegheny	3,321,317	577,234	--	26,000	3,924,551	1,594	149	--	10	220	1,973	38	1	6
Armstrong	4,246,880	3,393,943	86,578	--	7,727,401	[1] 1,484	579	34	--	128	2,225	145	--	16
Beaver	82,315	105,787	--	--	188,102	121	29	--	--	10	160	5	--	2
Bedford	--	104,256	--	--	104,256	--	69	--	--	--	69	7	--	--
Blair	--	1,088	--	--	1,088	--	3	--	--	6	9	1	--	1
Bradford	50	--	--	--	50	1	--	--	--	--	1	1	--	--
Butler	250,657	1,060,263	14,809	--	1,325,729	218	253	5	--	42	518	50	--	8
Cambria	5,027,225	2,131,208	--	725,900	7,884,333	4,211	638	--	112	385	5,346	80	8	14
Centre	602,864	612,077	--	--	1,214,941	231	154	--	--	70	455	20	--	6
Clarion	--	5,187,379	9,632	--	5,197,011	--	1,058	10	--	137	1,205	143	--	15
Clearfield	651,446	7,630,447	28,843	--	8,310,736	225	1,836	15	--	215	2,291	268	--	26
Clinton	--	390,768	--	--	390,768	--	127	--	--	9	136	17	--	2
Elk	--	664,630	9,630	--	674,260	--	108	8	--	6	122	36	--	2
Fayette	753,389	2,318,681	--	54,705	3,126,775	472	550	--	11	239	1,272	130	4	8
Fulton	--	12,500	--	--	12,500	--	4	--	--	--	4	2	--	--
Greene	6,892,325	1,092,546	--	--	7,984,871	3,888	234	--	--	232	4,354	63	--	4
Huntingdon	--	4,000	--	--	4,000	--	4	--	--	--	4	2	--	--
Indiana	8,138,008	2,522,058	92,308	50,025	10,802,399	4,639	575	25	8	246	5,493	166	1	15
Jefferson	81,088	2,404,153	2,561	--	2,487,802	50	513	3	--	51	617	100	--	11
Lawrence	--	671,946	17,580	--	689,526	--	137	9	--	4	150	29	--	1
Lycoming	--	490,197	--	--	490,197	--	71	--	--	27	98	6	--	2
Mercer	--	399,737	--	--	399,737	--	46	--	--	11	57	7	--	2
Somerset	2,681,453	3,663,783	41,297	--	6,386,533	1,399	1,003	18	--	324	2,744	207	--	24
Tioga	--	629,653	--	--	629,653	--	103	--	--	8	111	7	--	1
Venango	--	540,568	--	--	540,568	--	93	--	--	--	93	19	--	--
Washington	10,799,522	1,646,302	--	--	12,445,824	5,141	362	--	--	231	5,734	61	--	7
Westmoreland	800,041	1,987,197	9,183	7,842	2,804,263	405	517	3	13	61	999	111	2	3
	44,328,580	40,242,401	312,421	864,472	85,747,874	[1] 24,079	9,215	130	154	2,662	36,240	1,721	16	176

[1] Twenty-three workers were employed at coke operations.

Source: Pennsylvania Department of Environmental Resources, 1976 Annual Report on Mining, Oil and Gas, and Land Reclamation and Conservation Activities.

which was scheduled to open in 1978, would produce 250,000 tons per year of steam coal for utility customers. Coal from the two planned continuous-miner sections will be cleaned at Consol's Champion preparation plant.

Bethlehem Mines Corp. began producing coal from mine 38E located near Ehrenfeld on September 1, 1976, from the Upper Freeport seam. By 1978, production is expected to reach 400,000 tons per year of low-volatile metallurgical coal.

Gulf + Western was in the process of acquiring a controlling interest in Solar Fuel Co. located near Somerset.

Consolidation Natural Gas Supply Co. (CNG) based in Clarksburg, W. Va., purchased more than 6,700 acres of coal in western Greene County for probable use in a projected coal gasification plant. The coal, located in Aleppo Township, was sold to CNG by the Manor Real Estate Co., a subsidiary of the Penn Central Co.

The Greene County Commissioners executed a sales contract in early April with Henderson Mining Co., the coal-buying division of Jones and Laughlin Steel Corp. (J&L), for sale of 430 acres of Freeport coal underlying county-owned property in Franklin Township. J&L will be the first company to mine the Freeport seam in Greene County. Coal will be moved from the mine by conveyor belt to the Monongahela River for barge shipment to the Pittsburgh area. Henderson Mining Co. has already acquired 37,000 acres of Freeport coal near Waynesburg for future development.

In early January, Lykes-Youngstown Corp. arranged financing of the Emerald mine No. 1, expected to cost $70 million, with production beginning in late 1976. Two million tons per year of high-grade metallurgical coal is anticipated by 1979.

Two affiliates of PP&L, the Greene Manor Coal Co. and the Greene Hill Coal Co., purchased coal properties in Greene County from Manor Real Estate Co., Hillman Coal and Coke Co., and West Properties Trust. Greene Manor Coal Co.'s purchase of 497 acres in Center Township in late January brings the total acreage owned to 12,107 acres of Pittsburgh Coal; Greene Hill Co.'s purchase of 98 acres in Center and Gray Township brings its total to 30,993 acres. With these purchases, PP&L plans to increase its coal reserves.

Pennsylvania Mines Corp., a subsidiary of PP&L, announced in early March assumption of ownership of the Oneida Mining Co. from the parent company, the North American Coal Corp., according to a 1970 contract between the two parent companies. PP&L also owns Greenwich Collieries, Rushton Mining Co., and Tunnelton Mining Co., all suppliers of coal for PP&L's powerplants.

Quaker State Oil Refining Corp. of Oil City acquired the Valley Camp Coal Corp., a company based in Cleveland, Ohio, with coal properties in West Virginia. Under terms of the merger, a maximum of 3.16 million shares of Quaker State stock is issuable to shareholders of the Valley Camp Coal Corp.

The Donora Borough Council plans to sell 120 acres of Freeport coal beneath Palmer Park to Consolidation Coal Co. The Freeport seam is located approximately 900 feet below the surface.

Royal Resources, a Fairmont, W. Va., firm purchased three tracts of land totaling 210 acres in Whitely Township, Greene County, and all coal seams except the Pittsburgh bed.

U.S. Steel's Cumberland mines at Kirby, Greene County, began operations in November. All the coal from the mine will be shipped to a powerplant in Ontario, Canada, under a 30-year contract.

Although employment increased 6% to 36,240, the number of employee-days worked throughout the bituminous region increased nearly 4%, indicating additional lost time by unauthorized work stoppages.

In early August, after a 4-week strike, coal miners in the Appalachian area returned to work. The dispute began July 19 at a Cedar Coal Co. mine in Kanawha County, W. Va., near Charleston, and pickets spread the strike throughout the Appalachian region. The executive board of the United Mine Workers of America (UMWA) met in Charleston, W. Va., in early August and voted for an immediate end to the walkout and expulsion of any workers from the UMWA refusing to return to work.

Of the 36,240 employees in the bituminous region, 57.6% were classified as inside employees and 42.4% as outside employees. Nearly 69% of the inside employees were classified as mechanical loading, 31% as all other occupations, and less than 1% as shot firers, pick miners, cutting-machine operators, and hand-loading miners.

Washington, Indiana, Greene, Cambria, and Armstrong Counties produced 35.10 million tons or 79.2% of its total deep-mined coal. Clearfield, Clarion, Somerset, Armstrong, and Indiana Counties produced 22.40 million tons, or 55.6% of the total strip-mined coal. Indiana, Armstrong, Somerset, and Clearfield Counties produced 80% of the total auger-mined coal. Cambria County produced 84% of the coal reclaimed from refuse piles. Collectively, Washington, Indiana, Clearfield, Greene, Cambria, and Armstrong Counties produced 55 million tons, or 64% of the State's total bituminous coal production, and had 25,443 employees or 70% of the total employees of the State's bituminous coal industry.

Table 6.—Pennsylvania: Value of bituminous coal, by county, in 1976

County	Value (thousands)
Allegheny	$111,205
Armstrong	147,604
Beaver	4,085
Bedford	W
Blair	W
Butler	29,108
Cambria	284,363
Centre	24,058
Clarion	90,079
Clearfield	172,076
Clinton	6,889
Elk	11,594
Fayette	64,037
Fulton	W
Greene	257,843
Huntingdon	W
Indiana	245,554
Jefferson	48,019
Lawrence	10,772
Lycoming	W
Mercer	7,940
Somerset	152,455
Tioga	W
Venango	14,506
Washington	414,631
Westmoreland	59,783
Undistributed	16,407
Total [1]	2,173,009

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."
[1] Data do not add to total shown because of independent rounding.

A 12-million-ton-per-year coal transfer facility will be built in Duquesne for the Union Railroad. The $4 million to $5 million project was scheduled to be completed in early 1978.

The State of Pennsylvania planned to purchase 365,700 tons of coal during the year for State buildings. Savings of over $4 million will be realized through use of less expensive bituminous coal instead of the higher priced anthracite. Starting July 1, the State will pay an average of $37.30 per ton of anthracite delivered to State institutions, down $11.60 from the current price; and bituminous will cost $24.30, down $11.46 from the cost in previous years.

The $36 million coal gasification plant dedicated in early September near Homer City, Indiana County, produces synthetic fuels from coal. The Bi-Gas facility using the Bituminous Coal Research Inc. process produces 2.4 million cubic feet of pipeline-quality methane gas daily using 120 tons of coal. The Indiana County plant is the largest in the United States, and total project cost is estimated at $66 million.

Westinghouse Electric Corp.'s Waltz Mill site in Westmoreland County will be used to convert high-sulfur coal to a clean, low-heat gas for electric power generation. By the early 1980s, the Waltz Mill plant will be using 50 tons of coal per hour to produce the gas. Currently, small amounts of coal have been processed at the plant without the need for pretreatment.[15]

Coke.—Output of 16.2 million tons of coke, valued at $1.4 billion, ranked Pennsylvania first in national output and value.

J&L's A–5 battery at its Aliquippa Works is one of the newest and most modern coke plants in the Nation. A hot coal slurry, isolated from the atmosphere, to reduce air pollution is directed to 56 coke ovens. Coking time per oven is also reduced from 17 hours to 11½ hours. Time is saved by flash drying the wet crushed coal and heating the coal to 450°F. The Aliquippa Coke Battery is the fourth in the Nation to use pipeline charging and only the second to use the whole system. The first coal at Aliquippa was processed in early January with a full annual production rate of 1 million tons by late summer.

U.S. Steel announced in early June a proposed reduction in coke output at the Clairton works from a current 7½ million tons to about 5 million tons due to excessive modernization costs to meet environmental standards.

The Labor Department issued new regulations in early October to protect workers from coke oven emissions, ordering employers to make specific engineering and work rule changes. Under the new rules, coke-oven workers will not be allowed to work in factory air containing more than

[15] Mining Congress Journal. November 1976, p. 11.

0.15 milligram of benezene-soluble particulate emissions per cubic meter of air, averaged over 8 hours. The new rules also cover medical examinations and special respiratory equipment for workers.

Peat.—Peat was produced by seven companies at eight operations in five counties. Three peat-producing operations were located in Luzerne County and one each in Erie, Lackawanna, Lawrence, and Monroe Counties. In the western part of the State, peat was produced near Leesburg, Lawrence County, by D. M. Boyd Co. and by the Corry Peat Products Co., near Corry, Erie County. Production in the eastern part of the State was near White Haven, Luzerne County, by International Peat, Inc., and near Thornhurst, Monroe County, by Pennsylvania Peat Moss, Inc.

Of the total peat produced, 92% was classified as humus, 6% reed sedge, and the remaining 2% as moss. Peat is used mainly for general soil improvement.

Petroleum and Natural Gas.—The American Petroleum Institute reported a total of 1,262 oil and gas wells drilled for a total footage of 2,856,697 feet compared with 1,399 wells and 3,353,341 feet in 1975. Of the total wells, 1,191 were in proved fields; 641 classified as oil, 535 gas, and 15 as dry. The 71 remaining wells were exploratory, 10 were drilled for oil, 30 gas, and 31 were listed as dry.

Indiana County led all other counties in the total number of wells drilled with 257, of which 254 were in proved gasfields. Venango County followed with 238 wells, all but 2 being drilled in proved oilfields. Other leading counties were Warren, McKean, and Forest.

UGI Corp. announced in early February a $6 million drilling program for natural gas in western Pennsylvania. Drilling was planned to begin in early April with expected gas deliveries from these fields by November. UGI has gas leases on approximately 50,000 acres of land in Forest and Warren Counties. During 1975, 12 wells were drilled on these properties.

Equitable Gas Co. plans to allot one-third of its $30.5 million budget for drilling and connecting new gas wells and to stimulate production from old wells. Equitable's subsidiary, Kentucky West Virginia Gas Co., plans to drill 30 new wells; 12 will be drilled deeper; and 40 existing wells will be connected.

Peoples Natural Gas Co. plans to accelerate its activity in the search for gas. Currently, the company has 1,275 wells and 2,800 outside connections. Half of Peoples' $12.8 million budget will go for an 83-well program to explore and to continue increased production of Appalachia gas. Peoples' 1975 record of 28.6 billion cubic feet of gas produced and purchased was expected to be surpassed in 1976.

The U.S. Geological Survey, under a 5-year program will assess the gas potential of black shales of Devonian age that underlie an area of more than 160,000 square miles in the Appalachian basin. The Devonian shales, a sequence of fine-grained black, brown, and dark gray organic rich bituminous rocks, range in thickness from less than 25 feet in parts of Alabama and Georgia to more than 1,500 feet in parts of Pennsylvania.[16]

Degasification of coal seams will also help to ease the natural gas shortage. Gas from the coal seam of the Emerald Mines Corp. will flow into the pipelines of Equitable Gas Co. by yearend.

On February 16, Governor Shapp announced his decision to end the 8-year ban on natural gas drilling in Lake Erie.

[16] U.S. Department of the Interior. News Release, Mar. 31, 1976.

Table 7.—Pennsylvania: Oil and gas well drilling completions, by county, in 1976

County	Proved field wells [1]			Exploratory wells			Total	
	Oil	Gas	Dry	Oil	Gas	Dry	Wells	Footage
Allegheny	--	--	--	--	1	--	1	3,631
Armstrong	1	67	2	--	--	--	70	234,262
Beaver	--	--	--	--	1	--	1	6,666
Butler	1	--	--	--	--	2	3	4,283
Cambria	--	--	1	--	--	--	1	4,011
Clarion	4	7	1	1	--	2	15	37,496
Clearfield	--	17	1	--	11	2	31	127,024
Clinton	--	2	--	--	--	1	3	4,618
Crawford	11	6	1	--	4	2	24	89,974
Elk	3	3	1	--	--	1	8	15,082
Erie	--	13	--	--	1	2	16	51,165
Fayette	--	--	--	--	--	2	2	7,090
Forest	87	8	3	2	1	4	105	147,998
Indiana	--	254	1	--	1	1	257	909,439
Jefferson	--	70	--	--	4	1	75	242,230
Lawrence	--	1	--	--	--	--	1	906
Lycoming	--	--	--	--	1	--	1	6,325
McKean	108	3	--	3	--	2	116	217,013
Mercer	--	--	--	--	1	1	2	9,646
Potter	4	--	--	--	--	--	4	5,453
Somerset	--	--	--	--	--	1	1	3,501
Tioga	--	--	--	--	--	1	1	4,660
Venango	236	--	1	1	--	--	238	184,151
Warren	186	1	1	3	--	2	193	206,917
Washington	--	7	1	--	1	--	9	30,557
Westmoreland	--	76	1	--	3	4	84	302,599
Total	641	535	15	10	30	31	1,262	2,856,697

[1] Development wells as defined by American Petroleum Institute.

Source: American Petroleum Institute.

The extremely cold weather in January and February caused many problems in Pennsylvania. Frozen rivers in the Pittsburgh district prevented barge shipments of coal and fuels urgently needed by industry and local citizens. Due to the high consumption of natural gas, shortages occurred resulting in curtailments by the utilities. Equitable Gas Co. was the first to order rationing, labeling the situation an emergency and ordering its industrial customers to stop production. Columbia Gas Co. imposed the same curtailments and asked residential customers to lower thermostats to 65° F or lower. Peoples Natural Gas Co. asked 205 industrial customers to reduce gas use for the duration of the cold weather and ordered schools served by the company to close. The steel industry reacted by shutting down operations for which they could not find substitute fuels which resulted in thousands of idled workers in the Pittsburgh area. Governor Shapp ordered all public and private schools closed from January 26 through February 2 to save dwindling supplies of natural gas and to avert possible cutoff to residential customers. The Governor also ordered all public schools in the State heated by natural gas to remain closed through February 1, but those heated by other fuels were free to reopen.

Pittsburgh public and parochial schools and nearly all school districts in western Pennsylvania not served by Columbia Gas Co. were scheduled to reopen on February 7 with lowered thermostats, which curtailed schedules and practically eliminated afterschool activities. Schools served by Columbia Gas Co. were scheduled to reopen on February 9, but with more stringent restrictions.

In Philadelphia, PEC in early February cut natural gas supplies to plant maintenance levels for all of its suburban industrial customers and commercial users who normally receive 50,000 cubic feet per day. Previously PEC, which serves 252,000 customers, made the same cuts to its 110 largest customers in Bucks, Chester, Delaware, and Montgomery Counties. Ten days later, the big industrial and commercial firms were allowed to reopen. Columbia Gas announced in early January a 35% curtailment to industrial customers beginning April 1 and continuing through October 31, with a 15% curtailment to commercial and a 10% curtailment to schools.

Consolidated Natural Gas announced in early March curtailment of gas to customers of more than 6% during the year. Other Pennsylvania gas companies reduced natural gas supplies to customers throughout the year.

In early February, CNG, parent firm of Peoples Natural Gas Co., announced that Sonatrach, Algeria's state-owned gas and oil company, will sell to CNG approximately 600 million cubic feet of natural gas, to be transported to the United States in liquefied form by tanker. CNG also planned to form a natural gas storage company in a joint venture with Texas Eastern Transmission Co. The storage company would in effect be the world's largest single storage field, containing 270 billion cubic feet of gas, located in north central Pennsylvania.

The price of Pennsylvania-grade crude oil increased $1.82 per barrel to $13.82 per barrel compared with the 1975 level. Principal buyers of Pennsylvania crude oil are Pennzoil, Quaker State, Wolfs Head, and Kendall.

Quaker State's four refineries, located in Pennsylvania and West Virginia, processed 7.3 million barrels of crude oil in 1974 and a lesser amount in 1975 due to a work stoppage at one refinery. Quaker State plans to spend $16.5 million in 1976 for oil development and exploration.

The 84-mile oil pipeline from Marcus Hook to PP&L's Martin Creek Station was completed; initial pumping began on August 9. Martin Creek units 1 and 2 are coal-fired, but units 3 and 4, each rated at 800 kilowatts, will burn oil to provide needed generation capacity. The two new units were also provided with evaporative cooling towers to prevent discharge of heated water into the Delaware River.

NONMETALS

Cement.—Portland cement shipments from 16 plants in 8 counties were 3% greater in quantity and 10% greater in value than in 1975. The average unit value per short ton increased $1.99 to $30.92 compared with that of 1975.

Masonry cement shipments from 14 plants in 8 counties were 6% greater in quantity and 15% greater in value, with an increase in unit value of $3.59 to $44.60 compared with the 1975 level.

Northampton and Lawrence Counties were the largest producers of both portland and masonry cements. Other producing counties included Allegheny, Berks, Butler, Lehigh, Montgomery, and York. Of the 5,989,337 tons of portland cement sold, 10.5% was used by building material dealers, 21.6% by concrete product manufacturers, 58.8% by ready-mix companies, 7% by highway contractors, 1.6% by other contractors, and less than 1% for government agencies and miscellaneous customers.

Consumption of energy for the 16 producing plants was 583,942,000 cubic feet of natural gas, 317 thousand 42-gallon barrels of fuel oil, 1.27 million tons of bituminous coal and 981,268,000 kilowatt-hours of electricity.

Major producers of portland and masonry cement include Amcord, Inc., Medusa Corp., National Gypsum Co., Penn-Dixie Industries, Inc., and U.S. Steel Corp. Coplay Cement Manufacturing Co. ordered a new cement kiln for its Nazareth plant. The kiln will have a capacity of 3,100 tons per day and will operate on the energy-saving heat-exchange principle.

Clays.—During the year, 68 clay operators, two fewer than last year, had operations in 26 of Pennsylvania's 67 counties, and produced 17% more in quantity and 16% more in value than in 1975. Unit price per ton was $7.22, 3 cents less than in 1975.

Clearfield County, with 17 operations, was the leading producer with 567,651 tons valued at $9,137,000. Other counties with a high production of clay included Beaver, Jefferson, Lawrence, and York.

Leading producers, in descending order of production, included Glen-Gery Corp., Veon, Talph A. Inc., Dresser Industries, Inc., Reese Bros., Hanley Co., and Darlington Brick and Clay Products Co.

Clays were used mainly for common and face brick, firebrick, and portland and other cements. Other minor uses included flue linings, high-alumina refractories, pottery, sewere pipe and drain, and quarry and structural tile.

Table 8.—Pennsylvania: Clays sold or used by producers, by use [1]
(Short tons)

Use	1975	1976
Common brick	68,549	192,506
Face brick	851,421	862,955
Firebrick, block and shapes	646,602	681,675
Flue linings	41,421	93,807
Lightweight aggregates	40,000	13,642
Mortar and cement, refractory	16,378	30,675
Paint, pesticides, rubber, other fillers	2,797	W
Portland and other cements	108,675	149,774
Sewer pipe	W	W
Tile:		
Floor and wall, ceramic	4,300	--
Drain, quarry, structural	50,671	56,910
Other uses [2]	65,696	111,730
Exports:		
Refractories	48,791	97,812
Total	1,945,301	2,291,486

W Withheld to avoid disclosing company proprietary data; included with "Other uses."
[1] Excludes kaolin.
[2] Includes electrical porcelain (1975), fertilizers (1976), flower pots (1976), pottery (1976), roofing granules, terra cotta, waterproofing and sealing (1975), and data indicated by symbol W.

Graphite.—Two companies in Elk County and one company in Northampton County produced synthetic graphite. Principal uses for the synthetic graphite were anodes, graphite shapes, crucibles and vessels, and electric motor brushes. Compared with that of 1975, production was 18% less, but value was 39% more.

Gypsum.—One company in Philadelphia County calcined gypsum. Output decreased 9%, but value increased 38.6% compared with 1975 levels. Calcined gypsum was used mainly for prefabricated products such as regular wallboard, type X wallboard, and lath.

Iodine.—The Whitmoyer Laboratories Inc., Lebanon County, and the West Agro Chemical Inc., Washington County, consumed crude iodine in the manufacture of calcium iodate, hydriodic acid, ethylenediamene dihydroiodide, and iodofors, which are used in pharmaceuticals, catalysts, stabilizers, and for sanitation.

Lime.—Ten plants operated by eight companies in eight counties produced 2,069,033 tons valued at $68.4 million, 7% greater in quantity and 14% greater in value than in 1975. Nearly 84% of the total lime produced and 83% of the total value was attributed to the production of quicklime; hydrated lime accounted for the remainder.

Centre County, with three plants, was the leading producer in the State, with 31% of the total production and 28% of the total value. Other producers are as follows, in alphabetical order: Adams, Butler, Chester, Lebanon, Mifflin, Montgomery, and York Counties.

Nearly 62% of the total lime sold or used by producers was for the steel industry, with lesser amounts used for water purification, sewage treatment, agriculture, and other purposes.

Table 9.—Pennsylvania: Lime sold or used by producers, by use
(Thousand short tons and thousand dollars)

Use	1975		1976	
	Quantity	Value	Quantity	Value
Steel, BOF	982	29,900	1,034	32,937
Water purification	205	6,228	258	9,043
Steel, electric	124	3,762	151	4,662
Sewage treatment	101	3,081	94	3,092
Steel, open-hearth	66	1,999	93	2,983
Agriculture	50	1,704	66	2,181
Mason's lime	86	2,227	64	1,778
Acid mine water	36	1,096	27	966
Paper and pulp	23	714	24	729
Finishing lime	24	630	W	W
Tanning	6	192	7	262
Other uses [1]	237	8,514	252	9,724
Total [2]	1,940	60,047	2,069	68,356

W Withheld to avoid disclosing company proprietary data; included with "Other uses."
[1] Includes refractory dolomite, other chemical uses, explosives, petroleum refining, sand-lime brick, insecticides, sugar refining, other ore concentration, silica brick, wire drawing, soil stabilization (1976), other metallurgy, paint, alkalies, magnesite (1975), and uses indicated by symbol W.
[2] Data may not add to totals shown because of independent rounding.

Dravo Corp. signed a 15-year contract valued at $85 million to provide lime to help clean smokestack gases of a coal-fired Allegheny Power System Inc. generating plant to be built near Sisterville, W. Va. Dravo announced a 20-year contract valued at about $200 million to supply 300,000 to 375,000 tons of lime each year to a new powerplant in Shippingport. The plant is owned by the Central Area Power Coordinating Group of utilities, which includes Cleveland Electric Illuminating Co., Duquesne Light Co., Ohio Edison Co., Pennsylvania Power Co., and Toledo Edison Co. Recently, Dravo signed a third long-term contract with Columbus and Southern Ohio Electric Co. for lime deliveries over a 15-year period.

Mica.—Scrap and flake mica was produced by one company in Adams County. Compared with 1975 levels, production of mica decreased 16%, but increased 2% in value. Mica is used in vacuum-tube capacitors and various electrical and nonelectrical items.

Mullite.—One company produced high-temperature sintered mullite in Philadelphia County. Compared with 1975 levels, quantity and value decreased 53% and 22% respectively. Mullite is a heat-resistant silicate of aluminum used in furnace linings.

Perlite.—Crude perlite was shipped into the State and expanded at five plants by four companies in five counties. A sixth plant located at New Eagle, Washington County, was scheduled to be in production in January 1977. Production in 1976 totaled 33,085 short tons, with an average value per ton of $81.74 compared with 33,693 short tons valued at $78.55 per short ton in 1975. The product was used principally for plaster, horticulture, and cement aggregates. Minor uses were for filter aid, low-temperature insulation, fillers, foundry uses, insulating board, formed products, castable insulation, and bonding mortars.

Sand and Gravel.—The total output of sand and gravel increased 9.4% from 17.4 million tons in 1975 to 19 million tons in 1976. Average value per ton for construction sand and gravel was $2.66 and for industrial sand and gravel, $7.30. Construction sand and gravel was used mainly for concrete aggregate and concrete products. Lesser uses were for asphaltic concrete aggregates and other bituminous mixtures, roadbase and coverings, and other uses. Of the 17,975 tons of construction sand and gravel used, 64% of the processed and 1% of the unprocessed sand and gravel was used for commercial purposes; 30% of the processed and 1% of the unprocessed sand and gravel was used for government projects. Ninety-four percent of the industrial sand and gravel was unground sand used mainly for glass manufacturing, fire or furnace, engine, molding, blasting, and other purposes. The remaining 6% of the industrial sand and gravel was ground and used for foundry, porcelain and tile, abrasives, enamel, and other uses.

The number of sand and gravel operations producing less than 25,000 tons totaled 27, and those producing less than 100,000 tons totaled 71, which was 53% of the total number of sand and gravel operations in the State. Only one operation produced in excess of 1 million tons.

Sand and gravel was produced in 40 of the State's 67 counties. Bucks County led with 18% of the State's total. Other leading counties, in descending order of production, were Armstrong, Erie, Beaver, and Lawrence.

Table 10.—Pennsylvania: Sand and gravel sold or used by producers

(Thousand short tons and thousand dollars)

Use	1975		1976	
	Quantity	Value [1]	Quantity	Value
Construction:				
Processed:				
Sand	8,495	21,111	9,669	24,886
Gravel	6,947	17,771	8,307	22,971
Unprocessed: Sand and gravel	954	810	--	--
Industrial sand	1,005	7,120	1,063	7,757
Total [2]	17,401	46,813	19,038	55,611

[1] Value f.o.b. plant per ton of processed sand and per ton of processed gravel. Values in all other tables are f.o.b. plant of blended processed sand and gravel used as construction aggregate. Unit value of construction aggregate is generally higher than the unit value of unblended processed sand or gravel.

[2] Data may not add to totals shown because of independent rounding.

Table 11.—Pennsylvania: Construction sand and gravel sold or used, by major use category

(Thousand short tons and thousand dollars)

Use	1975		1976	
	Quantity	Value	Quantity	Value
Concrete aggregate (residential, nonresidential, highways, bridges, dams, waterworks, airports, etc.)	6,410	17,116	7,940	21,366
Concrete products (cement blocks, bricks, pipe, etc.)	1,937	5,215	3,267	8,935
Asphaltic concrete aggregates and other bituminous mixtures	1,052	2,756	3,109	9,778
Roadbase and coverings	898	1,989	1,673	3,494
Fill	509	697	1,465	3,539
Other uses	487	521	522	745
Total [1]	11,294	28,295	17,975	47,854

[1] Data may not add to totals shown because of independent rounding.

Table 12.—Pennsylvania: Sand and gravel sold or used, by county

(Thousand short tons and thousand dollars)

County	1975				1976			
	Number of mines	Quantity	Value	Number of companies	Number of mines	Quantity	Value	Number of companies
Allegheny	1	W	W	1	1	W	W	1
Armstrong	6	1,723	5,746	4	6	1,960	6,639	4
Beaver	5	1,178	3,331	4	4	994	3,088	4
Bedford	--	--	--	--	1	W	W	1
Berks	2	W	515	2	2	W	W	2
Blair	1	W	W	1	1	W	W	1
Bradford	3	577	W	2	4	W	W	2
Bucks	4	2,362	6,160	3	5	3,469	9,113	4
Butler	4	319	584	3	4	294	847	3
Cameron	--	--	--	--	1	W	W	1
Carbon	2	W	W	2	3	W	W	2
Clarion	1	W	W	1	--	--	--	--
Columbia	2	W	W	1	2	W	W	1
Crawford	5	496	1,100	5	6	505	1,228	6
Cumberland	2	W	W	2	2	W	W	2
Dauphin	1	W	W	1	1	W	W	1
Erie	11	1,522	2,902	11	14	1,954	4,024	14
Forest	2	W	W	2	2	W	W	2
Franklin	2	W	W	1	2	W	W	1
Fulton	1	W	W	1	1	W	W	1
Huntingdon	1	W	W	1	1	W	W	1
Lackawanna	--	--	--	--	1	W	W	1
Lancaster	2	W	W	2	2	W	W	2
Lawrence	5	644	1,354	5	9	809	2,079	9
Luzerne	5	724	2,433	5	5	630	1,549	5
Lycoming	2	W	W	1	1	W	W	1
Mercer	2	W	W	2	3	298	604	3
Mifflin	1	W	W	1	1	W	W	1
Monroe	3	192	541	3	5	364	970	5
Northampton	3	752	1,755	3	3	680	1,556	3
Northumberland	1	207	522	1	1	230	619	1
Pike	1	140	403	1	2	W	W	2
Potter	1	W	W	1	--	--	--	--
Schuylkill	1	71	295	1	1	74	319	1
Somerset	1	W	W	1	1	W	W	1
Tioga	3	351	420	3	6	307	529	6
Venango	7	834	1,329	7	8	587	1,232	7
Warren	8	524	1,093	8	11	435	1,027	10
Wayne	3	211	583	3	4	242	662	4
Westmoreland	1	355	1,483	1	1	W	W	1
Wyoming	3	618	1,775	3	2	W	W	2
York	3	W	W	2	3	W	W	2
Undistributed	--	3,602	14,418	--	--	5,204	19,529	--
Total [1]	112	17,401	48,742	102	133	19,038	55,611	121

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."
[1] Data may not add to totals shown because of independent rounding.

The leading producers of construction and industrial sand and gravel were as follows, in descending order of production: Warner Co., Davison Sand & Gravel Co., Penn Glass Sand, Glacial Sand and Gravel Co., Erie Sand Steamship Co., and Refractory Sand Co., Inc.

Seventy-two percent of sand and gravel was shipped to market by truck, 23% by water, and the remaining 5% by rail or other means, or used at the plant site.

DER plans to ban dredging for sand and gravel on the Upper Allegheny River within a 5-year period. Preservation of the river as a natural, scenic, and recreational resource was the primary reasons for adopting the Departmental policy.

Stone.—Pennsylvania led in total stone production, crushed stone, crushed sandstone, dimension slate, and crushed miscellaneous stone; ranked second in dimension sandstone, and dimension miscellaneous stone; and third in output of crushed limestone.

Compared with that of 1975, total stone production in Pennsylvania increased 6% from 60.2 million tons to 63.6 million tons. The value also increased 11% from $150 million to $165.9 million.

Crushed stone was produced by 139 com-

panies at 230 quarries for roadbase aggregate, roadstone, cement, and other uses. Output of crushed stone increased 6% to 63.5 million tons valued at $161.2 million. Leading companies were Koppers Co., Bethlehem Steel Corp., and New Enterprise Stone & Lime Co.

Dimension stone was produced by 29 companies at 32 quarries for rough construction, dressed flagging, cut stone, and other uses. Output in 1976 decreased 9% to 65,112 tons valued at $4.6 million. Leading producers of dimension stone were A. Dalley and Sons, Inc., and Delaware Quarries.

The unit value of all stone increased 12 cents per ton to $2.61 in 1976. Unit values of other types of crushed and broken stone were limestone, $2.54; granite, $2.75; sandstone, $2.73; traprock, $2.37; and other stone, $2.39 per ton. Unit value of all dimension stone increased $3.17 per ton to $71.25 in 1976.

Of the 261 quarries operating in 54 counties, 17 each were in Bucks and Lancaster Counties, 16 in Northampton, 15 in Berks, and 13 in Montgomery. Montgomery County was the leading producer of stone, followed by Lancaster, Bucks, York, Berks, and Northampton.

Stone production by size of operation showed 69 quarries each producing less than 25,000 tons, and only 10 quarries each producing over 900,000 tons were operating in 1976.

During the year, 87% of the crushed and broken stone was shipped to market by truck, 7% by rail, less than 1% by water, 3% by other means, and 2% by unspecified methods.

Table 13.—Pennsylvania: Production of dimension stone,[1] by use

Use	1975		1976	
	Quantity (short tons)	Value (thousands)	Quantity (short tons)	Value (thousands)
Irregular-shaped stone	18,690	$353	15,960	$332
Dressed flagging	11,180	462	11,160	542
Cut stone	W	W	10,810	387
Roofing	5,973	1,039	5,390	934
Structural and sanitary purposes	6,066	1,262	4,786	1,191
Rubble	2,873	36	2,519	31
Rough flagging	2,141	70	1,946	55
Billiard tables	1,987	457	1,772	405
Blackboards	264	136	193	100
House stone veneer	115	3	140	4
Rough blocks	3,917	279	--	--
Flooring	963	159	W	W
Other uses[2]	17,060	593	10,430	657
Total[3]	71,231	4,849	65,112	4,639

W Withheld to avoid disclosing company proprietary data; included with "Other uses."
[1] Includes sandstone, slate, granite, and miscellaneous stone.
[2] Includes rough monumental (1976), dressed construction, electrical fixtures, curbing, and uses indicated by symbol W.
[3] Data may not add to totals shown because of independent rounding.

Table 14.—Pennsylvania: Production of crushed stone,[1] by use

(Thousand short tons and thousand dollars)

Use	1975		1976	
	Quantity	Value	Quantity	Value
Dense-graded roadbase stone	16,650	36,390	15,006	34,818
Roadstone	8,955	19,450	10,496	24,350
Cement manufacture	7,089	13,960	8,345	16,551
Bituminous aggregate	5,760	14,410	6,989	18,081
Concrete aggregate	6,217	15,189	6,005	15,236
Surface treatment aggregate	3,038	6,433	3,700	8,196
Lime manufacture[2]	3,471	8,665	3,635	10,703
Flux stone	2,729	8,772	2,778	9,278
Agricultural limestone	1,707	6,948	1,786	8,484
Railroad ballast	1,267	3,326	1,306	3,430
Macadam aggregate	1,154	2,619	1,114	2,418
Riprap and jetty stone	430	1,037	910	2,261
Mine dusting	123	995	141	1,415
Building products	218	564	95	223
Other filler	117	746	92	1,304
Filter stone	82	212	78	203
Refractory stone	137	1,785	54	623
Acid neutralization	28	W	24	W
Asphalt filler	56	320	W	W
Other uses[3]	875	3,008	986	3,679
Total[4]	60,106	144,820	63,542	161,250

W Withheld to avoid disclosing company proprietary data; included with "Other uses."

[1] Includes limestone, miscellaneous stone, sandstone, traprock, and granite.

[2] Includes dead-burned dolomite (1976).

[3] Includes mineral food, whiting, glass, fill, abrasives, terrazzo and exposed aggregate, sulfur dioxide, waste material, and uses indicated by symbol W.

[4] Data may not add to totals shown because of independent rounding.

Table 15.—Pennsylvania: Stone production, by size of operation, in 1976

Size of operation	Total stone			Dimension stone			Crushed and broken stone		
	Number of quarries	Short tons	Percent of total	Number of quarries	Short tons	Percent of total	Number of quarries	Short tons	Percent of total
Less than 25,000	69	347,325	.5	32	65,112	100.0	37	282,213	.4
25,000 to 49,999	19	647,825	1.0	--	--	--	19	647,825	1.0
50,000 to 74,999	12	750,503	1.2	--	--	--	12	750,503	1.2
75,000 to 99,999	13	1,156,204	1.8	--	--	--	13	1,156,204	1.8
100,000 to 199,999	41	6,119,924	9.6	--	--	--	41	6,119,924	9.6
200,000 to 299,999	28	6,852,436	10.8	--	--	--	28	6,852,436	10.8
300,000 to 399,999	22	7,694,975	12.1	--	--	--	22	7,694,975	12.1
400,000 to 499,999	26	11,425,847	18.0	--	--	--	26	11,425,847	18.0
500,000 to 599,999	9	4,914,470	7.7	--	--	--	9	4,914,470	7.7
600,000 to 699,999	4	2,576,797	4.0	--	--	--	4	2,576,797	4.0
700,000 to 799,999	2	1,474,578	2.3	--	--	--	2	1,474,578	2.3
800,000 to 899,999	6	5,032,968	7.9	--	--	--	6	5,032,968	7.9
900,000 and over	10	14,613,315	23.0	--	--	--	10	14,613,315	23.0
Total	261	63,607,167	--	32	65,112	--	229	63,542,055	--

Table 16.—Pennsylvania: Stone sold or used by producers, by county

(Thousand short tons and thousand dollars)

County	1975			1976			Kind of stone produced in 1976
	Number of quarries	Quantity	Value	Number of quarries	Quantity	Value	
Adams	3	W	W	3	W	W	Limestone, traprock.
Allegheny	1	80	228	1	W	W	Sandstone.
Armstrong	4	160	531	6	589	1,430	Limestone.
Bedford	3	W	W	3	W	W	Limestone, sandstone.
Berks	14	3,460	7,209	15	4,098	8,633	Limestone, sandstone, traprock.
Blair	6	W	W	6	1,382	3,849	Limestone, dolomite, quartzite.
Bucks	16	4,227	10,323	17	W	W	Do.
Butler	6	W	6,133	8	W	W	Limestone, sandstone.
Carbon	3	W	W	2	W	W	Limestone, quartzite.
Centre	7	2,546	6,213	8	2,563	6,467	Limestone.
Chester	11	3,394	7,776	11	3,577	8,658	Limestone, sandstone, traprock, quartzite.
Clarion	3	267	813	3	277	937	Limestone, sandstone.
Clearfield	--	--	--	1	102	270	Sandstone.
Clinton	1	W	W	1	W	W	Limestone.
Columbia	1	W	W	2	W	W	Limestone, sandstone.
Cumberland	7	1,264	2,837	7	980	2,514	Do.
Dauphin	3	1,074	2,138	3	1,099	2,359	Do.
Delaware	3	W	W	3	W	W	Sandstone, traprock.
Elk	1	W	1	3	43	187	Sandstone.
Fayette	5	W	W	3	W	W	Limestone.
Forest	--	--	--	1	1	W	Sandstone.
Franklin	3	W	W	3	W	W	Sandstone, limestone.
Fulton	2	W	W	2	W	W	Limestone.
Huntingdon	7	W	W	7	707	1,660	Limestone, quartzite.
Indiana	1	W	167	1	32	W	Sandstone.
Jefferson	1	W	W	1	30	77	Do.
Juniata	1	179	312	1	97	193	Limestone.
Lackawanna	1	W	W	2	W	W	Sandstone.
Lancaster	17	3,932	10,236	17	4,560	12,257	Limestone, dolomite, other.
Lawrence	4	1,090	3,199	4	1,310	3,256	Limestone.
Lebanon	3	2,725	6,949	3	2,898	7,754	Do.
Lehigh	9	2,091	W	9	2,146	4,409	Limestone, slate.
Luzerne	5	1,105	2,840	5	868	2,095	Sandstone.
Lycoming	2	W	W	2	W	W	Limestone.
McKean	3	W	W	5	38	138	Sandstone.
Mercer	1	W	W	1	W	W	Do.
Mifflin	5	324	745	4	225	577	Limestone.
Monroe	3	830	2,183	3	653	1,753	Limestone, sandstone, other.
Montgomery	13	4,910	12,092	13	5,039	12,964	Limestone, dolomite, sandstone, granite.
Montour	3	W	W	3	W	W	Limestone.
Northampton	18	3,724	8,984	16	3,849	9,208	Limestone, quartzite, slate.
Northumberland	3	W	W	3	502	1,165	Limestone, sandstone.
Perry	1	W	W	1	W	W	Limestone.
Pike	1	W	W	1	W	W	Traprock.
Potter	2	W	W	2	W	W	Sandstone.
Schuylkill	3	W	W	3	668	1,484	Limestone, sandstone, quartzite.
Snyder	1	W	W	2	W	W	Limestone.
Somerset	6	W	W	6	688	2,534	Limestone, sandstone.
Susquehanna	5	117	472	8	W	W	Sandstone.
Tioga	1	237	431	3	152	303	Do.
Union	3	W	W	2	W	W	Limestone.
Wayne	2	280	602	4	W	W	Sandstone, other.
Westmoreland	8	2,033	6,028	8	2,615	7,176	Limestone, sandstone.
York	10	W	W	9	4,209	13,543	Do.
Undistributed	--	20,128	50,228	--	17,610	48,039	
Total	246	60,177	149,670	261	63,607	165,889	

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."

Sulfur.—Three petroleum refineries operated by three companies in Delaware and Philadelphia Counties plus one steel company in Allegheny County produced 90,551 long tons of sulfur and sold or used 91,257 long tons. Compared with 1975 levels, sulfur sold or used increased 34% in output and 52% in value. Stocks of sulfur decreased from 1,338 long tons on January 1 to 633 long tons at yearend.

Tripoli.—Crude tripoli was mined by Keystone Filler and Manufacturing Co., Lycoming County. Compared with 1975 levels, the tonnage sold or used and value increased 93% and 114%, respectively. Tripoli is used mainly for abrasive purposes.

Vermiculite (Exfoliated).—Crude vermiculite shipped into the State was exfoliated by three companies, one in each of three counties. The total quantity and value sold or used by producers was greater compared with 1975 levels. Major uses in the building industry were for lightweight concrete aggregate, loose fill insulation, and other purposes.

METALS

Cadmium.—Pennsylvania ranked fourth in smelter production of cadmium behind Colorado, Illinois, and Idaho, but first in value. Production of cadmium in the State increased 264% in quantity and 301% in value. Cadmium, which is produced from smelting zinc ores, is used for electroplating parts of appliances, motor vehicles, and machinery.

Copper.—Pennsylvania had a minimal production of copper during the year. Copper was obtained as a byproduct from processing other mined minerals.

Iron Ore.—Bethlehem Mines Corp. produced iron ore at its Grace underground mine in Berks County. Production was 1% less than in 1975. All concentrates were pelletized prior to shipment to Bethlehem's steelmaking facilities.

Iron Oxide Pigments.—Production was in five counties by six companies. United States Steel produced iron oxide from steel plant dust in Allegheny County. Both Pfizer, Inc., and Reichard-Coulston Inc., Northampton County, produced natural and synthetic pigments. Other counties in which production occurred included Carbon, Chester, and Montgomery. Production totaled 46,584 short tons valued at $17.4 million compared with 39,540 short tons valued at $13.9 million in 1975. Iron oxide pigments were used in paints, rubber, plastics, concrete products, paper, magnetic ink, fertilizers, and animal food.

Iron and Steel.—Shipments of pig iron in Pennsylvania in 1976 totaled 17.98 million tons valued at $3,159,081,988, an increase of 4% in total shipments and nearly 9% in value compared with that of 1975. At the beginning of 1976, 25 blast furnaces were operating and 25 were idle for a total of 50 furnaces, compared with 34 operating furnaces and 16 idle the year earlier. Types of pig iron produced were basic, bessemer, malleable, and direct castings, having an average value per ton of from $74.38 to $94.03.

In early September, steel firms announced layoffs due to a current business downturn. J&L closed one blast furnace at its Aliquippa plant and one open-hearth furnace at its Pittsburgh works. U.S. Steel's Fairless Hill works reported two of eight furnaces in the open hearth were idled, with production curtailments occurring in the rolling mills and processing lines. Other Pittsburgh-based steel firms also reported curtailment of steelmaking operations outside of the Pennsylvania area.

Early in the year, the U.S. Department of Labor announced that nearly 1,300 specialty steel workers at five Pittsburgh area plants were eligible for special compensation because of jobs lost as a result of foreign competition. Covered by the Labor Department's ruling are an estimated 500 workers of the Universal-Cyclops Specialty Steel Division, Bridgeville plant; 300 at the Pittsburgh plant; 300 at the Titusville plant; and 20 at the Aliquippa plant. In addition, up to 150 former employees at Teledyne-Vasco's tool steel plant at Latrobe would be affected by the ruling. Jobless steel workers could receive 70% of last year's $176-per-week average wages for up to 52 weeks.

Phoenix Steel Corp., a specialty steelmaker controlled by the French company, CREUSOT-LOIRE, S.A., announced in early November closing of the structurals division in Phoenixville, affecting 672 employees. The company's seamless pipe and tubing products division was not affected by the layoffs.

J&L, a unit of LTV Corp., ordered components for a new electric furnace steelmaking facility at its Pittsburgh works. Other modernization plans included con-

struction of a 2-furnace basic oxygen shop to replace the plant's 11 open-hearth furnaces and pollution control equipment improvements. Duquesne Light Co. will supply J&L's electric furnace with up to 200,000 kilowatt-hours, increasing Duquesne Lights total output by 7% or 8%. To meet this new electric demand, Duquesne Light will expand an electric substation and install miles of underground high-voltage transmission cable.

Universal Cyclops will install at its Bridgeville plant a 50-ton argon-oxygen decarburization (AOD) furnace along with an advanced environmental control system to serve both electric furnace melting and the new AOD refining operations. Completion was scheduled for early 1978.

U.S. Steel decided to build a $3 billion steel plant on the Pennsylvania-Ohio line near Lake Erie. Environmental studies of the area were underway at yearend.

Table 17.—Principal producers

Commodity and company	Address	Type of activity	County
Abrasives: Satellite Alloy Corp.	9800 McKnight Rd. Pittsburgh, Pa. 15237	Plant	Allegheny.
Cement:			
Amcord, Inc.[1]	610 Newport Center Dr. Newport Beach, Calif. 92660	----do	Northampton.
Coplay Cement Manufacturing Co.[1]	Nazareth, Pa. 18064	----do	Lehigh and Northampton.
Keystone Portland Cement Co.[1]	Box 1785 Allentown, Pa. 18105	----do	Northampton.
Louisville Cement Co	501 South 2d St. Louisville, Ky. 40202	----do	Lawrence.
Medusa Corp.[1 2]	Box 5668 Cleveland, Ohio 44101	----do	Lawrence and York.
Penn-Dixie Industries, Inc.[1 2]	60 East 42d St. New York, N.Y. 10017	----do	Butler and Northampton.
United States Steel Corp.[1 3]	600 Grant St. Pittsburgh, Pa. 15230	----do	Allegheny and Northampton.
Clays:			
Dresser Industries, Inc	Box 6504 Houston, Tex. 77005	Pit	Clearfield and Somerset.
Glen-Gery Corp	227 North 5th St. Reading, Pa. 19601	Pit	Adams, Berks, Northumberland, Union, York.
Hanley Co	28 Kennedy St. Bradford, Pa. 16701	Pit	Jefferson and McKean.
Resco Products	Box 108 Morristown, Pa. 19404	Pit	Clearfield and Huntingdon.
Coal, anthracite:			
Greenwood Stripping Corp.	1 Venice St. Nesquehoning, Pa. 18240	Strip mine	Carbon and Schuylkill.
Jeddo-Highland Coal Co	800 Exeter Ave. West Pittston, Pa. 18643	Strip mine and culm bank.	Luzerne.
Leon E. Kocher Coal Co	Box 127 Valley View, Pa. 17983	Underground mine	Schuylkill.
Reading Anthracite Co	200 Mahantongo St. Pottsville, Pa. 17901	Culm bank and strip mine.	Northumberland and Schuylkill.
Coal, bituminous:			
Barnes & Tucker Co	357 Lancaster Ave. Haverford, Pa. 19041	Underground mine	Cambria.
Bethlehem Mines Corp.[4 5]	701 East 3d St. Bethlehem, Pa. 18016	----do	Cambria and Washington.
C&K Coal Co	Box 69 Clarion, Pa. 16214	----do	Greene.
Pittsburg & Midway Coal Co.	10 Main Center Kansas City, Mo. 64105	----do	Washington.
Graphite, synthetic:			
Air Reduction Co., Inc	Theresia St. St. Marys, Pa. 15857	Plant	Elk.
Charles Pfizer & Co., Inc.[5]	235 East 42d St. New York, N.Y. 10017	----do	Northampton.
Stackpole Carbon Co	St. Marys, Pa. 15857	----do	Elk.
Gypsum, calcined: United States Gypsum Co.[6]	101 South Wacker Dr. Chicago, Ill. 60606	----do	Philadelphia.

See footnotes at end of table.

Table 17.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Iron oxide pigments:			
The Prince Manufacturing Co.	Bowmanstown, Pa. 18030	Plant	Carbon.
Reichard-Coulston, Inc	15 East 26th St. New York, N.Y. 10010	----do	Northampton.
Lime:			
The J. E. Baker Co.[1]	Box 1189 York, Pa. 17405	----do	York.
Mercer Lime & Stone Co	1640 Oliver Bldg. Pittsburgh, Pa. 15222	----do	Butler.
National Gypsum Co.[1 2 7]	325 Delaware Ave. Buffalo, N.Y. 14202	----do	Centre.
Peat:			
Lake Benton Peat Moss	1418 North Main St. Scranton, Pa. 18508	Bog	Lackawanna.
Perlite, expanded:			
Armstrong Cork Co	Lancaster, Pa. 17603	Plant	Lancaster.
Atlantic Perlite	Box 345 Primrose, Pa. 19018	----do	Delaware.
Pennsylvania Perlite Corp	Box 2002 Lehigh Valley, Pa. 18001	----do	Lehigh and York.
Perlite Manufacturing Co	Box 478 Carnegie, Pa. 15106	----do	Allegheny.
Petroleum refineries:[8]			
Sand and gravel:			
Davison Sand & Gravel Co.	34th Ave. and 4th St. New Kensington, Pa. 15068	Dredge	Westmoreland.
Dravo Corp	One Oliver Plaza Pittsburgh, Pa. 15222	----do	Beaver.
Erie Sand Steamship Co	Erie, Pa. 16500	----do	Erie.
Shippingport Sand & Gravel Co.	1200 Slambaugh Bldg. Youngstown, Ohio 44501	Pit	Armstrong.
Warner Co.[1 4]	1721 Arch St. Philadelphia, Pa. 19103	Pit	Bucks.
Stone:			
G. & W. H. Corson, Inc.[4]	Plymouth Meeting, Pa. 19462	Quarry	Montgomery.
The General Crushed Stone Co.	712 Drake Bldg. Easton, Pa. 18042	----do	Bucks, Chester, Delaware, Lancaster, Luzerne, Perry.
Glasgow Quarry, Inc	Route 2, Box 121 Glasgow, Mo. 65254	----do	Montgomery.
Martin-Marietta Corp	11300 Rockville Pike Rockville, Md. 20852	----do	Centre, Chester, Fayette, Northampton.
New Enterprise Stone & Lime.	New Enterprise, Pa. 16664	----do	Bedford, Blair, Cumberland, Franklin, Huntingdon, Somerset.
Sulfur:			
Atlantic Richfield Co	3144 Passyunk Ave. Philadelphia, Pa. 19145	Plant	Philadelphia.
British Petroleum Corp., Ltd.	Box 428 Marcus Hook, Pa. 19061	----do	Delaware.
Gulf Oil Corp	Box 7408 Philadelphia, Pa. 19101	----do	Philadelphia.
Sun Oil Co	1608 Walnut St. Philadelphia, Pa. 19103	----do	Delaware.
Tripoli:			
Keystone Filler & Manufacturing Co.	Muncy, Pa. 17756	Pit	Lycoming.
Vermiculite, exfoliated:			
Hyzer & Lewellen	Box 155 Southampton, Pa. 18966	Plant	Bucks.
W. R. Grace & Co	62 Whittemore Ave. Cambridge, Mass. 02140	----do	Lawrence.

[1] Also stone.
[2] Also clays.
[3] Also coal.
[4] Also lime.
[5] Also iron ore.
[6] Also expanded perlite.
[7] Also cement.
[8] Many major oil companies operate refineries in Pennsylvania and several commercial directories contain lists of them.